The Builder.

VOL. LXXXVI.—No. 3192. APRIL 9, 1904.

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The Baltimore Fire and its Lessons.

THE great Baltimore fire was the result of certain untoward circumstances which, combined, had the effect of destroying the principal business quarters of that city, to the entire disorganisation of business and with great monetary loss to all concerned. Such a combination of adverse circumstances is one from which London has generally been free, partly thanks to the careful administration of the old Building Act, partly owing to the excellent work of the Fire Brigade throughout Sir Eyre Massey Shaw's reign at the Southwark Bridge-road headquarters, and partly to the good fortune of London seldom having two serious outbreaks at the same time, and scarcely ever having a gale of wind during an outbreak or a serious explosion in the early stages of a fire.

The advantages of the excellent administration of the old Building Act, and the present and future administration of the law as it now stands and as it is to be amended, should not blind us to the lessons to be learnt at Baltimore from the building officials' point of view. Similarly the excellence of our fire service in Sir Eyre Massey Shaw's time, and the efficiency and good management which we are convinced we shall obtain under the present Chief Officer, Captain Hamilton, must not blind us to the Fire Brigade aspect of the Baltimore conflagration, more particularly as London was subject to some very serious fires during the interregnum of the two chiefs named.

Explosions will happen and gales will spring up, and circumstances will combine to complicate an outbreak of fire even in the best-managed of cities. Though our legislators may ride the high horse and state that a catastrophe such as that of Baltimore would be impossible in London, we regret to differ, and to state that, given similar circumstances—namely, an explosion in a very large building to start the fire, and a gale of wind to fan it—there are a number of districts in the Metropolis which would be entirely devastated, both in the historical square mile and in the West End, in spite of the protection available through the Building Act and the efforts of the Brigade. The inferior construction to be found in many districts in which a most inflammable stock is sold, and the utter disregard of that great fire risk involved in windows overlooking mutual areas or facing narrow thoroughfares and alleys, will on such an occasion discount the effect of the existing building regulations and of any Fire Brigade work.

In brief, the direct cause of the fire at Baltimore was a small outbreak in Hurst's building, followed by an explosion in the upper story of this building which spread the fire to adjoining property, the flames being fanned by a strong wind. The surprise and temporary disorganisation of the Fire Brigade, caused by the explosion, affected to a certain degree the handling of the fire. Fanned, as indicated, by the wind, and facilitated by a great disregard to party walls in the district in question and the great stock of highly-combustible contents, the fire spread with almost unheard-of rapidity. The obvious mistake of dynamiting property was then resorted to in the panic of the authorities, with the result that the contents of many of the minor buildings were spread in such a way as to assist the development of the conflagration. In fact, had it not been for some modern fire-resisting buildings on one of the boundaries of the fire area, combined with some old monumental buildings, such as the Court-house, the Post Office, and the City Hall, and had it not been for a harbour basin on the second boundary and a river on the third, everything in the city to the lee side of the wind would inevitably have been destroyed. In other words, some well-built structures, a waterway and a river, formed the fire stops; and although these fire stops were supplemented by the work of innumerable fire brigades drawn from surrounding districts, and even from as far as New York, over 500 miles away, the efforts of the fire brigades in themselves would not have been effective without the fire stops to aid them.

The principal lesson thus to be learnt from Baltimore is that as long as ordinary forms of internal construction are in use, and the risk of the vertical opening is disregarded, the conflagration hazard is a very considerable one.

The vertical division of blocks of buildings is the *sine qua non* of fire protection. Next, however, to the main principle of vertical division comes the question of construction, and here we find the most important point to be the maximum division into a number of small risks of the vertical and horizontal divisions that are fire-resisting, and in order to obtain these divisions it is essential in the first instance that all

iron work and all steel work should be thoroughly well protected with non-combustible coverings at least 2 in. thick, and that no metal structural work, however trivial, be left exposed to fire.

It has been amusing to read the comments of an ill-informed daily press regarding the failure of the fire-resisting buildings at Baltimore, when with independent notes and photographs before us we see that Baltimore has served as the great example to the whole world of what modern fire-resisting construction will do under the severest of tests. The fire-resisting building of modern design, with its steel work duly protected, has withstood the fire to an extent that has far surpassed the expectations of the most enthusiastic admirers of modern forms of fire-resisting construction. Protected steel work and concrete floors have practically gained a victory which no amount of writing, lecturing, or experimenting would have obtained for them. The modern building of fire-resisting construction stands in amongst the ruins of Baltimore as a monument to the foresight of those who have foretold by aid of experiments what a building will do if carefully designed and suitably protected. In these modern buildings the entire contents and every particle of woodwork in fittings and furnishings have been burnt out, or, one might say, swept out, inasmuch as the contents have not only been burnt out, but the ashes have been swept away by the draught created during the fire. The plain carcase alone stands, with its floors, partitions, and verticals generally intact, and its metal work as a rule absolutely firm and true. Only in some instances, where the tile work has been too thinly and unsuitably applied to the lower flanges of the girders or around the stanchions, has the tile work disappeared in part or whole, with the result that such girders have deflected and the columns perhaps buckled.

To put it in plain figures, however, quite 50 per cent. of the value of these modern structures has been saved by careful construction, and it is now only a question of repair and rapid reinstatement and not a question of re-erection.

To repeat—as far as these modern buildings are concerned, nothing has escaped, with the exception of the brick walls and such of the metal work as has been duly protected by concrete, brick, or thick terra-cotta. All classes of stone containing lime are disintegrated, and most of the plaster and wire partitions are broken down and useless, as was only to be expected, seeing that they were only intended to afford temporary or at the most partial protection as distinct from full protection against fire, as "full" protection is generally understood. The only thin partitions that have escaped in part were those of brick, porous brick, and terra-cotta. Regarding floors in these buildings, where concrete has been used there is practically very little damage, whilst where terra-cotta blocks have been used the lower web has generally come off, so that the floors will have to be replaced by new ones. Where steel work has been protected by terra-cotta, unsuitably applied, instead of by concrete it has been frequently entirely denuded of this so-called protection, and, as was anticipated by those who knew best, the protection afforded by well-made concrete gave least cause for complaint.

To quote an American correspondent, "the tile advocates have been badly beaten, and no amount of advertising will give them back the position they previously held." In other words, our leading authorities on fire protection in Europe have been correct in their prognostications, and the conversion of our own Office of Works to concrete floors in the new Government buildings in Whitehall has been most judicious. It would be well if other public departments would also soon follow suit, so that Government property should be no longer subject to the unnecessary risk of unreliable horizontal division in the form of tile floors, the form of which, as adopted, appears to be one of the few that have so far not been reliably investigated in London and appears to have played a somewhat unsatisfactory *rôle* in an official New York test, of which we find particulars published in an American engineering contemporary.

Ferro-concrete appears to have also come out of the Baltimore fire in a satisfactory manner where the metal rods were sufficiently protected by the concrete, and this remark refers to its use vertically for walls as well as horizontally for floors.

In the monumental buildings of the older type granite appears to have been the most treacherous of the building stones employed, and the older brickwork at Baltimore was certainly not found to be as fire-resisting as our brickwork here.

Turning to matters of detail, it may be of interest to name the steel frame buildings which were constructed on modern lines and were involved in this conflagration. There was the Continental Trust building at the corner of Baltimore and Calvert-street; then the Equitable building at the corner of Calvert and Fayette-street, next the Calvert building at the corner of Fayette and St. Paul's streets; the Union Trust building at the corner of Charles and Fayette-street; the Maryland Trust building at the corner of Calvert and Jermyn-street; the Herald building at the corner of Lexington and St. Paul's-street; and, lastly, the Merchants' National Bank in Water-street. It is a curious factor that nearly all these more important buildings of modern construction were corner buildings, and thus subjected to the additional hazard of having two frontages.

Regarding the Equitable building, this was a steel skeleton structure of ten stories, built in 1892, and the worst damaged of this series. The floors were of terra-cotta, and from top to bottom every floor panel, for about half the area of the building, had collapsed. The steel framework, which was stoutly protected, however, stood very well as far as the vertical supports were concerned, and fairly well as regards horizontal beams. The structure need not be razed for reconstruction, but can be repaired. Had it not been for the terra-cotta flooring adopted in this building there would not have been any reason for complaint, having regard to the fact that the building dates back a whole decade.

The Calvert building is three years old. It shows an unusually heavy form of terra-cotta fireproofing and protected steelwork. It came through the fire in what might almost be termed perfect condition, except for the failures in connexion with the terra-cotta fireproofing and a buckled column on the first floor where the terra-cotta had fallen. Regarding the terra-cotta flooring, although of unusually heavy construction, it has been so damaged as to require a considerable amount of reinstatement, entire floor panels having their bottom webs destroyed and the vertical webs cracked or broken. The net result, however, is that the steel work, with the exception of one column, can stand.

The Union Trust building and the Maryland Trust building are very much alike, and show similar construction. They are both four years old, eleven stories in height, have the lower portion of the façade in stone and the upper portion terra-cotta. The terra-cotta façade is apparently chipped and broken in many places. The stone façade is, however, chipped and cracked very seriously. The steel work, having been protected, has stood the fire exceedingly well. On the other hand, the terra-cotta floors will have to be for the most part reinstated, owing to defects similar to those in the previous building.

The Continental Trust building has sixteen stories. It was completed about eighteen months ago, and embodied the most up-to-date American methods. The column protection here remained intact throughout. The floors, however, have shown the same defects as before, *i.e.*, the numerous breaks on the lower webs of the tiles; but no floor panel has in this case come down bodily. Reconstruction of the floors will, we expect, be necessary.

To go on with further descriptions in an article of this kind would scarcely be worth while, seeing that the general lessons of the conflagration only are to be recorded. But there is already a very plain lesson to be learnt from the few particulars presented, and that is that good systems of concrete flooring are more reliable than tile flooring, and that of the proprietary systems the terra-cotta systems, unless materially improved, will gradually find themselves superseded. That the Americans had already recognised this to a certain extent prior to the Baltimore fire can be seen from the recent strenuous efforts to obtain a kind of reinforced terra-cotta floor. Several experiments had already been made with these, and seemed to show that the idea is deserving of development.

For the impending Building Act Amendments the experience at Baltimore should be borne in mind, and the protection of steel work be made compulsory, and the hollow floor excluded from buildings that are really intended to be fire-resisting, such as the buildings of the warehouse class. For separation purposes under the Building Act, in buildings partially used for tenements and partially used for trade, the solid floor should also be made an essential. Those who redraft the Building Act would do well to study the lessons of this great conflagration at Baltimore and other

recent experience at notable fires, for, combined with the results of the investigations so systematically carried out in this country of late years, the true limitations of certain systems of construction can now be traced, whilst the advantages of others may at last be said to stand as proven.

THE DIMENSIONS OF TEST BARS.

QUITE apart from the differences of tensile resistance shown by test bars of varying length, the variation of the percentage of elongation with test bars of different gauge length and sectional area requires careful attention. So far as ultimate strength is concerned, it is found that when the smallest part of the section of a test bar is very short a much greater stress can be resisted than when a long parallel rod of similar material is tested. In one case the greater breaking load is attributable to restriction of the flow of metal and in the other less than the normal strength is usually evidenced owing to the existence of weak places, and the longer the rod the more chances there are of weak places. With regard to the percentage of elongation, which is the measure of ductility, we must remember that for any given test bar the elongation in a given gauge length is made up of two parts:—(1) That due to general extension between the gauge points, and (2) that due to local contraction, which is practically independent of the gauge length. It has been known for some time that the percentage of elongation diminishes for any given size of bar as the gauge length is increased. But a fact not so generally recognised is that the elongation due to local contraction depends upon the cross sectional area of the test bar, and, consequently, that for a given gauge length the percentage of elongation varies with the cross section of the bar and increases for a given gauge length as the cross section increases. Some useful data with regard to the influence of gauge length and sections of test bars on the percentage of elongation are to be found in the recently-published report by Professor Unwin. This report gives the results of tests undertaken at the request of the Engineering Standards Committee. The tests cover a wide range of conditions, and the data obtained therefrom constitute a most valuable record upon the subject generally.

When measured on constant gauge length and constant area the elongations were such that the following conclusions could safely be drawn as to the real relative ductility of the plates tested:—(*a*) The *relative* ductility is practically the same, whether the test bars are 1 in. or ½ in. area. (*b*) The mean difference of percentage of elongation is 2·6 per cent. for ship plates and 2·9 per cent. for boiler plates. (*c*) Plates below ⅜ in. thick have less ductility than thicker plates. (This indicates that a special rule is required for plates less than ⅜ in. thick.) (*d*) For plates over ⅜ in. thick ductility diminishes as thickness increases. (Hence a special rule may be required for plates more than ⅞ in. thick if standard test bars have constant area.) (*e*) The falling off of ductility with increase of thickness is less in boiler plates than in ship plates, so that, while ⅜ in. boiler and ship plates have approximately the same percentage of elongation, 1¼ in. boiler plates have about 5 per cent. more percentage of elongation than corresponding ship plates. Some further data obtained from tests of annealed and unannealed plates with varying percentages of carbon throw useful light on the question of the variation of elongation, both with variation of section and variation of hardness. Further, it is interesting to observe that since the report was written Professor Unwin has found a general relation between the percentage of elongation and gauge length and cross section of bar. Thus, if e is the percentage of elongation in a gauge length l for a bar of the cross section A, we have

$$e = \frac{c\sqrt{A}}{l} + b$$

where the first term on the right is the elongation percentage due to local contraction, and the second is the percentage of general elongation, c and b being constants for any given quality of metal.

NOTES.

Workmen's Compensation.

IT is not, we think, surprising that the rates charged for insurance under the Workmen's Compensation Act have considerably increased. It was quite natural, apart from rate cutting, that the insurance companies should quote at the outset low rates. They desired to attract custom, and the extent of their liability was unknown. Some trust was placed in Mr. Chamberlain's estimate that the charge per cent. for insurance would in many trades not exceed a shilling per cent., but this estimate was mere guess work. With a simplification and enlargement of the acts in regard to workmen's compensation it is possible that there may be some lowering of rates, for there is an immense amount of money spent by the insurance companies in litigation which has to be taken into account in the rates. An extension and systematising of the acts may therefore benefit workmen, employers, and insurance companies. One thing, however, is certain; that whatever be the rates, the insurance business will increase. It is only a very large concern which can have its own insurance fund, and there is also much convenience in handing a claim over to a company and so incurring no further expenditure of time or money.

Proposed London Main Avenues.

DURING the sittings of the Royal Commission on London Traffic various refreshingly simple proposals have been made, many of them excellent in their way, but all involving expenditure on so huge a scale as to render their adoption highly improbable, not to say impracticable, under existing circumstances. A series of suggestions recently made by Messrs. C. S. Meik and Walter Beer are in every way commendable in theory, but, as the total amount of capital required is estimated at about 150,000,000*l*., it is difficult to see how they could be seriously entertained, except by an all-powerful body created and financed by Imperial Parliament. Further, the scheme in question merely relates to the construction of four main avenues passing from north to south and east to west, with various branch roads, an embankment between Waterloo and Blackfriars bridges, and a bridge to carry one of the new avenues over the Thames. The suggestion is that each main avenue should be 160 ft. wide and twelve miles long, commencing in open country and meeting in Clerkenwell. These avenues would be double-decked in town sections—the upper deck elevated above ground level—and single-decked in country sections. According to the printed designs, the accommodation in town sections provides for a double-track suspended railway, two tramway tracks, two carriage ways, and two footpaths on the upper deck; and for a motor road, two van roads, and two footpaths on the lower deck. The upper road would be regarded as the main avenue proper, the lower road being intended to keep motor vehicles out of the way and to facilitate the delivery and collection of goods without interfering with traffic. In country sections the upper deck would be brought down to ground level, providing the same accommodation as that on the elevated deck of the town sections. Up and down traffic approaches would give access from existing streets to the upper decks of the new main avenues, and it is suggested that tube railways might be constructed below the avenues. The proposed branch roads are intended to bring traffic into the main avenues from surrounding districts. These suggestions are apparently based on American practice in bridge design, but we are by no means clear that the partial gloom of the lower deck would be popular with the drivers of motor vehicles and vans, and unless a large force of police were provided to compel the use of the lower road by certain classes of traffic, we fear it would be very little used. The financial success of the enterprise is another element that would require the most serious consideration, and, regarded from this aspect, we fancy the scheme will offer little temptation to the heavily burdened ratepayers of the Metropolis.

British Timber and its Uses.

MANY of our readers will no doubt have carefully read the paper on "British Timber and its Uses" which was recently read at the Surveyors' Institution and was published in an abbreviated form in the *Builder* of March 5, the discussion thereon being reported in the number of March 26. But at the present moment, when spring is advancing, it appears desirable to call attention more particularly to the subject, since for the next six months our readers can study it for themselves. It is obvious that England is generally too much cultivated and too closely inhabited to be a country which can produce timber in large tracts. On the other hand, it is obvious that in the aggregate Great Britain can produce quantities of useful timber without injury to the beauty of the country. In other words, ancestral oaks and beeches need not be destroyed for business purposes. More care is needed of small woodlands and of hedgerow timber. A row of elms, for example, is cut down by a proprietor, sold, and turned into cash, but he does

not systematically replant. Trees are often left too long, with the result that they are destroyed by gales or rot away, and so are lost to the landscape, when by being felled at an earlier age and replaced, the landscape would never have been deprived of their greenery. In fact, the majority of English landed proprietors neglect their trees, and many who actually give some thought to the matter plant coniferous trees indiscriminately and quite overlook the deciduous forest trees. The whole subject requires public attention and study.

Electric Fatality.

THE lamentable accident by which Mr. George Crates, a young electrical engineer employed by the Charing Cross and Strand Electric Light Company, lost his life last week is deeply to be regretted. The engines had been shut down at the generating station and the voltmeter was reading zero when Mr. Crates started to remove nine of the fuses from the switch-board in order to cut off a particular section of the supply net-work for necessary repairs. He removed six of the fuses safely, but when in the act of removing the seventh there was a flash and a report, and he fell on his back with the fuse in his hand and died shortly afterwards. The doctor stated at the inquest that his face was scorched and his hair singed and that his death was due to electric shock. The engineer-in-charge stated that the occurrence was inexplicable, and suggested that it must have been a "static" charge. In our opinion, judging from the evidence given at the inquest, the shock must almost certainly have been due to a static discharge. There must have been a considerable quantity of electricity stored up at a high potential, and, therefore, one of the cables must have retained its charge after the machines slowed down. This may have been due to one of the fuses not making connexion or to one of them not being in its place. A cable under these circumstances simply acts like a Leyden jar of enormous capacity, and the shock from it might often be fatal. The length of time a cable can retain most of its charge under working conditions is sometimes two or three hours. Mr. Swinburne constructed electric lighting condensers at Teddington which retained their charge for three weeks. We have known of two cases where severe shocks have been accidentally received from a static discharge left in a cable. In most stations where such an occurrence is possible it is the rule to discharge the cables after the machines have been shut down. As to possible dangers from shock due to static charges, a word of warning ought to be given to those who use condensers in connexion with single-phase alternating current motors. If the condenser is not discharged after the motor stops it is a source of danger to the electrician in charge.

Decoration of a Communion Table.

A CURIOUS case was heard before the Consistory Court last week, in which the Rector and Churchwardens of St. Luke's, Chelsea, sought permission to decorate the Communion table with a memorial design in coloured marble mosaics on a ground of thin slate slabs hung to the woodwork of the table by screws. The first demand had been for permission to have a marble table placed on castors, so as to be movable, in order to comply with the ecclesiastical law which forbids a fixed altar. This apparently was not accepted, and the demand was then made for permission to affix a decorative mosaic design to the woodwork by screws, so that it should be removable. "The mosaics would be suspended on large wooden screws, and would not be cemented or made otherwise adhesive in any way to the holy table." The cubic capacity of the wood, it was stated, was 28 ft., and the other material did not include more than 4 cubic feet; so that, it was argued, this was essentially a wooden table. The Chancellor of the Diocese admitted the argument and sanctioned the table in this form. With the ecclesiastical law we are not concerned, but in other respects it seems to us to have been rather a foolish business. Mosaic is essentially a form of built-in ornament, and to hang it on removable slabs is a contradiction of its proper character, and in fact is a kind of decorative sham, quite at variance with the idea of a table. Since ecclesiastical law prescribes a table and not a fixed erection (for a reason which is perfectly logical and comprehensible), we cannot see any sense in trying to decorate it so as to make it appear what it is not, and is not permitted to be.

Advertisement Regulation in New Zealand.

WE are glad to hear from a correspondent in Christchurch, New Zealand, that the policy and the publications of the "Society for Checking the Abuse of Public Advertising" are not unknown in that colony, and have not been without their effect. They have had, we are told, considerable influence in inducing the Government of New Zealand to place on their statutes the following amendment to the Municipal Corporations Bill:—

Regulating Public Advertising.

"(*e*) For regulating, controlling, or prohibiting the display upon or over public buildings or bridges, or upon or over buildings, walls, fences, lamp-posts, pavements, or hoardings situated in or upon or adjoining any land or street, the property of the Corporation, or under the control of the Council, or the display in any manner so that it shall be visible from any such street or public place, of posters, placards, handbills, writings, pictures, or devices for advertising or other purposes."

It is gratifying to find that this movement is progressing in the Colonies, though it makes one ashamed of England that action in the same direction should be here so slow and less than half-hearted. Is there not at this moment to be seen a whole street front covered permanently with advertisements next door to Wren's great church in Cheapside—a standing disgrace to the City?

CHILDREN'S DRAWINGS.

THE Exhibition of the Royal Drawing Society, at 50, Queen Anne's-gate, is one of unique interest and value, illustrating, as it does, the free expression of natural art. The pictorial art of children from the early age of 2½ years to the more mature students of 19 years, is there expressed in the mediums of their own choice, and in the manner of their own inspiration. Their technique is their own, and is preserved from the influence of "style." The art director, Mr. T. R. Ablett, leads his pupils by a system which is based on self-initiation. Commencing with the fundamental truth, that all humanity is endowed with a certain pictorial talent, the pupil is assisted in the development of his powers of observation and imagination on the lines in which he is inspired. The success of this system is proved by the extraordinarily high standard of many of the drawings, which show a vigour of imagination and an illustrative power that are surprising.

The subjects are mostly drawn from memory. By encouraging observation and the natural tendency of children to draw objects of interest, and by a system of "snap shot" drawings, *i.e.*, drawing from memory a subject which has only been exposed for one second—the power of observation in detail is developed hand in hand with that of expression. Mr. Ablett also teaches by correspondence, and many of the most successful drawings have been done by the pupils thus taught. The earliest efforts of a child are usually shown by a surface description, the tendency to express texture coming before the feeling for line and form has been developed; and the steps of progression can be clearly followed in the work on exhibition.

It is significant that the drawing of animals by the youngest pupils is invariably superior to that of the human figure.

By last year's report, 23,700 papers were received from 470 schools. The youngest artist is Miss Joyce Egerton Lowe, aged 2½ years, and the subject drawn is a girl wearing a fur coat and a large hat. The texture of the fur, and the form and proportions of the hat, have chiefly interested this youthful observer. The landscape pencil drawings by Master David Staines, aged 6, are promising efforts at surface description, and show considerable feeling for form and composition. The work of Master Kenneth Shoesmith, aged 13, consists of drawings of sea and boats, and shows the keenest observation, with an ability to express form and surface; perhaps most successfully shown in a drawing of the swirling wash of a tug wheeling into position.

The prize given by the President (the Princess Louise) for girls is won by Miss Phyllis Buckland (10), with vigorous pencil drawings of a canal horse in yoke and out of it, drawn from memory, with astonishing appreciation of the varying muscular action in loaded movement and free movement.

The prize for boys is gained by Master G. Humphray S. Dixon (10–12), with a delightfully humorous set of pen drawings of a spontaneous decorative character.

Mr. G. F. Watts's prize is halved between Miss Eileen Hood (11) and Miss Margery Hood (15), sisters. The former has drawn a set of dog studies with wonderful directness, and is equally happy in her "imagination" subject, "Bringing in the Stragglers," in which the spirit of action is cleverly expressed. The work of Miss Margery is of a different nature, and belongs to indoor life, expressed by careful drawings of figures drawn with true feeling.

The winner of the R.D.S. Gold Star—Miss Magery Gough (14)—revels in the imagery of a fairy dream, illustrated by a set of clever pencil drawings. Master Brian Hatton's (14) Knight in Armour is a pen drawing which would be a credit to any artist.

Sir Jas. Linton's and Mr. Ablett's prizes are won by Miss M. Wood (19), with a series of brush sketches of children, delightfully fresh and direct, and expressing all the charm of children in the simplest way.

LITTLE WILD-STREET CHAPEL.—An order has been made by Mr. Justice Joyce, in response to the trustees' petition, for the payment to them of 7,000*l.*, together with leave to invest 3,865*l.* in respect of the St. Giles's Christian Mission to Discharged Prisoners, founded by Mr. George Hutton, of which the headquarters were established thirty-one years ago in the Baptist Chapel in Little Wild-street, Lincoln's Inn-fields. The chapel, recently demolished for the new street, Kingsway, was originally built there in the earlier half of the XVIIIth century. The London County Council paid as compensation a sum of 11,632*l.* 10s., and sold to the trustees for 3,865*l.* a fresh site for the erection, at an estimated cost of 7,000*l.*, of a new chapel and mission house. The new site consists of some 4,500 ft. superficial on the east side of Great Wild-street, at the corner of Wild-court. Messrs. E. Runtz and Co. have prepared the plans and designs for a mission chapel, with a capacity of 600 persons, and having a hall beneath. Dr. Gifford, the learned numismatist and librarian of the British Museum, was, until his secession in 1735, the pastor of the chapel in Little Wild-street.

St. Mary-le-Strand: as seen at present from the cleared site north of the Strand. Drawn by Mr. A. C. Conrade.

NEW VIEWS OF OLD BUILDINGS.

THE view of St. Mary-le-Strand here given is one that will only be visible during the period when the space cleared for the new buildings in the Strand and Aldwych is still open; it is a record, therefore, of what can only be temporary effect. It is from a sketch by Mr. A. C. Conrade.

MAGAZINES AND REVIEWS.

THE now inevitable personal article in art magazines is supplied in the *Art Journal* of this month by an article on Professor Tuxen, best known in England as a painter of Court "functions," but who began with much wider views as to subject, as some of the illustrations here show—notably a very good composition on the hackneyed subject of "Susanna and the Elders"—a mere excuse, of course, for a nude study, which, however, is exceptionally graceful and well drawn; a kind of power which was perhaps the result of a three years' study in Bonnat's *atelier*. Three other articles are occupied with collections: "The Rijks Museum at Amsterdam," "Acquisitions to Public Galleries," and the Dutch pictures in the National Gallery of Scotland; followed by an article on Lawrence and the original prices and present values of his pictures. He obtained what were considered good prices in those days; but the "Miss Farren," for which he received 100 guineas, sold at auction in 1897 for £2,250. He secured a great rise in prices during his lifetime, however, for in 1802 his price for a full-length was £120, while in 1820 it had gone up to £600. It is mentioned that while there are three Lawrences in the Louvre, there is no example of either Reynolds or Gainsborough; an extraordinary discrepancy; but Lawrence was one of the English painters for whom the French in late years have taken one of their fits of idolatry. The most interesting article in the number to our readers is one by Mr. J. A. Gotch on "Modern Furniture," the numerous illustrations to which show in a convincing manner what an immense advance has been made in this country of late in the combination of good taste and beauty of decoration with sound structural method—qualities in which English furniture is now superior to that produced in any other country. Among the numerous examples illustrated there is not one that is not thoroughly good, except, perhaps, the grand pianoforte on page 134, which is rather poor and stiff in line and treatment. Mr. Gotch (and we quite agree with him) is in favour of retaining the influence of old forms as models to work upon, rather than striving after an "originality" which is likely to lead to eccentricity both of line and of structural design.

In the *Magazine of Art* we come upon Lawrence again, in the shape of a series of letters and diary extracts in regard to the sittings for and the progress of his picture of the two Pattison boys with a donkey, exhibited under the title "Rural Amusement." The memoranda are amusing, though their interest is not quite commensurate with the space they occupy. A letter of Crabbe Robinson's to one of the Pattison family, written after Lawrence's death, shows that he had a sound judgment in regard to the popular portrait painter, for whom he had a strong personal regard. "I doubt whether Sir Thomas Lawrence will be considered a great painter by posterity. I incline to think not, but he was at least a skilful and popular artist, who did better than all others what his rivals tried to excel in, and he who does that is no common man." It is not every one who can judge a contemporary popular artist so soundly and impartially. Mr. Val Prinsep concludes his reminiscences of Rossetti, which do not do much to raise Rossetti in one's estimation. We get the character of a man who was an out-and-out Bohemian, even to the extent of a normal state of untidiness in his dress and his house—something worse than untidiness, in fact; who was an enthusiast about art but would not really work hard at it, having an odd idea that pictures could be painted by force of genius without the study of technique; who was exceedingly keen at driving a bargain over his works, and who despised all artists except himself and his own particular set. "I have a curious letter from him to my father-in-law," says Mr. Prinsep, "in which he congratulates him on having got rid of a picture by Leighton, and also two Turners, and insinuating that he should not purchase such things." It is amusing to read of a young painter called "Ned Jones," who was one of the brotherhood of art, and who was afterwards to be known as "Sir Edward Burne-Jones" (so it appears that the hyphen was a later invention in the painter's name), and who shared with Rossetti the most absolute dislike to anything like physical exertion or athletics (we can quite fancy that); Mr. Prinsep went up the river with them once, but adds: "I need not say that neither Rossetti nor Ned touched an oar. They reclined in the stern while I did the work." Mr. Prinsep expresses the opinion (which we have long held) that Rossetti was not a painter who wrote poetry, but a poet who painted pictures; which just sums up the position. Some reproductions of "Turner Caricatures" by Thomas Fearnley are amusing, especially one showing Turner's short figure, in a hat and long coat, standing on a bench, painting a sunset which casts shadows from the actual objects in the room. The landscape called "A burlesque of Turner's work," should rather be called an imitation; it is exceedingly like some of Turner's Italian compositions, and is much too serious to be called a burlesque. Mr. Aymer Vallance, in his article on "Good Furnishing and Decoration," deals this month with "The Boudoir," in which the very first illustration repeats a perpetually recurring mistake in the title "An 'Adams'' Boudoir"; how many times is one to have to remind people that the architect's name was "Adam," and not "Adams"? Considering that a boudoir is essentially a lady's sanctum or "own room," we do not think that any of the examples give the ideal character for such a room; they want grace and elegance; their lines are too square, and the character of room and furniture not sufficiently refined; some of the rooms are too stately for the idea of a boudoir; others too much like cottage rooms. It is all very well to study simplicity of line in furniture, in its proper place; but that is not in a boudoir. As to the detail of a chimney-piece "in the new style," it can only be called atrocious in taste; we are glad to find that it is from a French interior and not from an English one. It forms a sinister comment on the discussion or symposium on *L'Art Nouveau*, which is going on in the same magazine, and in which Mr. Reginald Blomfield hits the nail on the head when he says: "It has no regard to material, treating stone as if it were wood, and wood as if it were lead; and as to its intention, the crazy network

of its lines makes the sort of appeal that would be made by—a cluster of reptiles." "Perhaps *l'Art Nouveau* may do its work in showing once and for all to what depths it is possible to sink when all touch of tradition is lost. There is only one thing that it certainly is not, and that is art."

The *Burlington Magazine* contains an interesting article by M. Paul Vitry on the exhibition of the French Primitives ("Primitifs" would surely be more correct) which was to be opened this week at Paris, the object of which is to give a kind of general picture of artistic movement under the Valois, from Philip VI. to Henri III. An exceedingly curious altar-frontal from Narbonne, which will form one of the exhibits, is the subject of three illustrations. "Claydon House, Bucks," is the subject of an interesting article, to be continued by Mr. R. S. Clouston. This is more or less an Adam house, and the saloon, with its coffered cove to the ceiling, and its columned doors, is in the best style of Adam's work; we quite agree that the *rococo* marble chimney-piece introduced is a blemish to the room. Details given from other parts of the house are in a far less pure taste than the saloon, and are rampant with florid filagree ornament; the influence and work of Chippendale is suggested by the author to account for these, with considerable probability. An article on a collection of powdered blue Chinese porcelain belonging to Sir William Bennett gives some valuable information on this class of work, accompanied by some excellent illustrations.

The *Berliner Architekturwelt* is largely devoted to the German work for the St. Louis Exhibition. We have a double-page coloured plate of the large hall for German exhibits, in which *l'Art Nouveau* is in full swing. It shows low square columns at the sides, crushed by an enormous sloping roof out of which semi-circular Welsh vaults are scooped in the lower portion. Some of the details, given on another page, are fearful and wonderful. Some of the interiors of rooms, etc., for the Exhibition, are more sober in taste, but not in any other way remarkable. There are illustrations of a terrible design for a warehouse in the Rosentalerstrasse at Berlin, by Herr Messel, happily balanced by Herr Hoffmann's Municipal School of Handicraft in the same city, a building suitably and broadly designed without any eccentricity, and with a graceful tower at the angle. A few pages are devoted to an essay on Berlin architecture of the past year, by Herr A. Brüning, to which we may return.

The *Architectural Record* (New York) devotes an article to "The New Portals of St. Bartholomew's," in Madison-avenue, New York; a work to which we have already called attention in connexion with a more brief notice in *Scribner's Magazine*. The interest in the design consists partly in the fact that it is a modern instance of architectural decoration worked out by an architect acting in conjunction with several sculptors, the whole being thought out and designed so that the architecture should form a suitable frame for the sculpture, and the sculpture should be subordinate to and assist the whole effect of the architecture. That is the way to produce harmonious and effective architectural decorative design; and judging by the photographs, the result is a remarkable success. We have three doorways of Romanesque, or semi-Byzantine, character, with decorative foliage on the archivolts; sculptured subjects in the tympana; bronze doors with sculptured panels in relief; and a frieze of figures on a small scale between the archivolts of the two outer doorways and the central one (which rises higher than the others). There is only one decided fault—this frieze does not connect properly with the archivolts of the outer doors, stopping short of them instead of stopping against them, and thus producing rather the effect of being an after-thought, got into its place anyhow. We may also observe that the frieze, though its general decorative effect is very good, shows in the enlarged view that want of "style" in bas-relief, which is the short-coming, so far, of American sculpture, and on which we have before remarked in connexion with other works of the kind. As a whole, however, this piece of façade decoration is well worth attention. The architects are Messrs. McKim, Mead, and White; the sculptors, Mr. Herbert Adams, Mr. Philip Martiny, Mr. D. C. French, and Mr. Andrew O'Connor. The bronze doors, it may be observed, were completely modelled in clay, and then cast in one piece. It is unfortunate that in order to preserve these doors from injury, and also to have less heavy portals for opening and shutting, it appears (according to Mr. Sturgis, who writes the article), that the bronze doors are nearly always practically covered and out of sight, and that the whole effect of the decorative composition is therefore only to be seen by special arrangement. This is not the way things would have been done in the Renaissance period, when works of high art were produced in objects for daily use; and we think the church should rather make practical use of these doors, and recognise that if they get worn out, other or better ones may be produced. It seems that in modern times we are so astonished at having produced anything good that we are afraid of using it! In an article on the St. Louis Exhibition a great number of the erections are illustrated, which we have not space to comment on just now, the copy of the April issue having only reached us at the last moment.

In *Public Works* Mr. G. Allanson-Winn continues his interesting study (fourth article) on "Sea-coast Erosion," with diagrams of various arrangements of groynes for producing special results. He has arrived at the conclusion, however, that where deep-sea erosion is steadily progressing, beyond the line to which groynes can be constructed, no measures for protection can be considered anything more than merely palliative. His reasons for recommending slanting groynes in many cases in place of groynes placed at right angles to the coast, it would take too much space to go into here, but they are well worth attention. He has shown at least one decided case in which slanting groynes collected a quantity of shingle to defend the base of a cliff. The slanting groynes are at a much flatter gradient than those at right-angles to the coast, "and therefore the retreating water which causes the scour has less power to carry away the deposited shingle." Under some circumstances he thinks that lines of sheet piling parallel to the coast, at successive levels in the slope of the beach, and connected by low groynes, may be very effective in preventing denudation. Among other articles are "The Water Supply of Boston," by Mr. E. S. Sears, with the descriptions and drawings of the works at the Wachusett reservoir; a historical article on "Irrigation," by Mr. R. B. Buckley, and "Roman Drainage Works and Rivers Regulation," by Mr. Thomas Ashby, junr.

To the *Nineteenth Century* Mr. F. Wedmore contributes an article on "The Place of Whistler," which, as might be expected, is a more sane critical judgment than has been shown in most things that have been written about Whistler recently, and is a welcome relief to the series of idolising tirades which have been thrust upon us at every turn. Mr. Wedmore, in our opinion, takes Whistler's lithographs a great deal too seriously; but in general he gives an appreciation of the artist's real gifts and real limitations which may be taken as representing the truth about his art. He remarks on the variety of mediums in art used by Whistler—painting in oil and water colour, pastel, pencil, etching, lithography, and attributes this partly to a strong sense of the appropriate and the fitting in the technique of art, so that he enjoyed illustrating in each form of art its appropriate treatment (and, as Mr. Wedmore truly says, he never made a mistake in this respect); partly to the desire of change. The central principle with Whistler was that an art must be decorative; and, as Mr. Wedmore says, he might have been one of the greatest decorative painters of the world "had he had Tintoret's opulent palette, or the majesty of Veronese's draughtmanship, or the remote, suave dignity of design of Puvis de Chavannes." These Whistler had not; and with all his gifts, he is a much more light-weight artist than his admirers generally recognise.

The *Independent Review* contains a good article by Mr. Laurence Binyon on "Blake." He brings two prevailing elements in Blake's genius in pointing to his love of flames and of the sinuous lines which they produce, and to his passion for the naked form as the great poetic symbolism in the hands of the painter. Blake is an artist whom people either run mad about or regard with dislike and distrust. Mr. Binyon shares neither weakness; he can see Blake's greatness without being blind to his weaknesses; and the article is a very sound and just piece of criticism.

The *Fortnightly Review* contains an article "Of the True Greatness of Thackeray," which may be mentioned here, though not within our class of subjects, inasmuch as it is written by the editor of this journal.

In *Scribner* Mr. Montgomery Schuyler gives a description of "The Architecture of the St. Louis Fair." Why call it a "Fair"? The street people in Paris in 1900 certainly spoke of the exhibition as "*la foire*," but then they were supposed not to know any better. "Exhibition" is not only a more dignified appellation, but more in accordance with facts. The illustrations are amusing in a sense; the architecture seems very good for that kind of occasion, but so absolutely and entirely French in taste and manner that it is difficult to believe that these are not illustrations of the next (or the last) Paris Exhibition. It is a pity the architects concerned did not make an attempt to strike out a treatment of their own.

Harper contains an article on "Life and Diseases of Metals," by Mr. E. Heyn, Professor at the Technical Experiment Station of the Berlin Royal Polytechnic School. It is accompanied by some microscopic sections of copper and steel as influenced by wear or other agencies injurious to their structure.

The *Pall Mall Magazine* has an article on "A French Artist in London," M. Reynouard to wit, of whose slight but admirable sketches of London people and scenes a good many reproductions are given. We commend to special notice that of the girl "Copying at the National Gallery," and the two of "The Conductor" of the Guards' Band. His sketch of "A London Policeman" is not fair; he has (maliciously) selected a figure that is not typical of the Force. M. Reynouard, like most Frenchmen, seems to have found London depressing; but, on the other hand, he avers that no religious edifice in Europe compares in majesty with St. Paul's. Certainly there is no domed church in Paris to equal it, in spite of the Panthéon and the Invalides.

In the *Cornhill* Mr. J. E. Vincent writes a paper, which is as the voice of one crying in the wilderness, on the loss and mischief caused by the Thames floods, and the necessity of something being done. Without being a professed engineer, he hazards the assumption that "an age which has seen the Nile controlled might easily see the Thames reduced to discipline"; in which we cannot but agree with him. But it means a good deal of money, and there is the weight that pulls us down.

The *Antiquary* contains three articles of rather exceptional interest; one on "Neolithic and Other Remains Found Near Harlyn Bay, Cornwall," by Mr. J. P. Arthur; one on the history of the bagpipe, by Mr. J. H. MacMichael; and one on Ansley Church, Herts, by Mr. W. B. Gerish, who describes the church as a "miniature minster, perfect in its people's nave and aisles, its chapels in the transepts, and its ancient choir." The discoveries at Harlyn Bay consist of cists with skeletons, laid in the posture familiar in neolithic interments; an iron implement was found in one of the tombs, as to which there are doubts expressed whether it was not introduced at a later period and during a disturbance of the tomb. There are other theories to account for its presence without presupposing its use as a tool; though these seem to us rather far-fetched. We are inclined, however, on the showing of Mr. Arthur's article, to believe in the neolithic character of these interments.

In the *Century* Miss Edith Wharton has an article on "Villas near Rome," with some effective illustrations, some in colour, some in grey, of the gardens of d'Este, Lante, and one or two others. Perhaps the most remarkable things illustrated, however, are the Reservoir at Villa Falconieri, with its great cypresses mirrored in the calm water, and the garden sculpture at Caprarola. The same number contains a very interesting article on the Siberian railway, by Mr. Davidson, United States Consul at Antung, Manchuria, giving a description of the cars, the arrangements and charges for passengers, but no engineering details; it is an article written from the ordinary travellers' point of view.

BUTE MEMORIAL, ST. ANDREWS UNIVERSITY, GLASGOW.—A memorial bust of the Marquis of Bute, the work of Mr. Pittendreigh Macgillivray, R.S.A., has just been unveiled in the Bute Medical Buildings. The bust is more than life-size, and shows the Marquis in the robes of the Lord Rector of St. Andrews University.

HOW THE GOVERNMENTS OF EUROPE AND AMERICA PRESERVE THEIR ANCIENT MONUMENTS AND NATURAL SCENERY.*

THE adequate protection of ancient monuments and natural scenery is greatly desired by many of us, for they are now recognised as providing something more than amusement for antiquarians and subjects for landscape painters. It may therefore be of interest to examine briefly the steps taken by the Governments of Europe and America to bring about this result, although it is impossible, within the limits of our article to do more than indicate the general direction taken by legislation with regard to this matter.

We must realise at once that we cannot preserve the realities of antiquity, but memories and isolated examples only, and the same has to be said of the purely natural features of our landscape.

Let us face the fact at once then ; the glories of the past have departed for ever. Neither the technical skill nor the literary power of our greatest experts can do more than construct a reminder of them. To see that, we have only to compare the interest aroused by a paper on some ancient building read at a winter meeting of an archæological society with that awakened by a visit to the same building in the course of a summer excursion. Ancient remains which exist have much to teach ; it behoves us, therefore, who believe that their lesson is a beneficial one, to insure the continuance of their existence and the consequent prolongation of the lesson. And the same has to be said with regard to much of the natural landscape of this country.

So let us realise at once that in a time of commercial and industrial development, of constantly increasing population, when we are covering whole counties with houses, and when the jerry-built villa is invading our heaths and our pinewoods, when every street in our towns is undergoing improvement, the demands of the utilitarian have a tendency to swamp every other consideration, and the records of past ages, either in the natural features of our landscape or in the building of our ancestors, are swept away and lost for all time. Numberless instances of such destruction will occur to everyone—the primeval fen land is drained, and where the mowing machine comes the swallow-tail butterfly cannot remain ; the water from our grandest falls is conducted away in leaden pipes for generating electricity ; the triumphs of an age of bridge builders are destroyed that an iron-girder substitute may bear the weight of motor traffic; ancient barrows and stone circles are robbed in order that the flints they contain may be sacrificed to some practical use. The Cheddar cliffs are converted into road material ; Wren churches are destroyed that their site may bear a stupendous block of offices; mediæval almshouses are removed that tramways may be made. Much of this is, of course, inevitable, and I at least have no desire to share with Mrs. Partington the labours of stemming the Atlantic tide with a housemaid's mop. But the evil may be reduced to a minimum, and it may, I think, turn out that it is not an ocean's tide which we have to face, but only the flow of a river which may easily be controlled by an efficient system of locks. If our ancient monuments and our natural scenery is to be preserved, it seems to me that in the first place their preservation should be desired by the people at large, and it is for us who appreciate these treasures to cultivate that desire ; in the next place the central government should take the lead in effecting the wish of the nation. Let us see how far the Governments of Europe and America are giving the lead required.

Beginning near at hand, we see in France that national monuments of historic or artistic interest are scheduled under the direction of the Minister of Public Instruction and Fine Arts. In cases in which a monument is owned by a private individual, it usually may not be scheduled without the consent of the owner, but if his consent is withheld the State Minister is empowered to purchase compulsorily. No monument so scheduled may be destroyed or subjected to works of restoration, repair, or alteration without the consent of the Minister, nor may new buildings be annexed to it without permission from the same quarter. Generally speaking, the Minister is advised by a commission of historical monuments, consisting of leading officials connected with fine arts, public buildings, and museums. Such a commission has existed since 1837, and very considerable sums of public money have been set apart to enable it to carry on its work. In 1879 a classification of some 2,500 national monuments was made, and this classification has been adopted in the present law. It includes megalithic remains, classical remains, and mediæval, Renaissance, and modern buildings and ruins.

The Belgian people appear to have realised for a very long time the importance of preserving their historic and artistic treasures. By a royal decree of 1824 bodies in charge of church temporalities are reminded that they are managers merely, and while they are urged to undertake in good time the simple repairs that are needed for the preservation of the buildings in their charge, they are strictly forbidden to demolish any ecclesiastical building without authority from the Ministry which deals with the subject of the fine arts. By the same decree they are likewise forbidden to alienate works of art or historical monuments placed in churches. Nine years later, in 1835, in view of the importance of assuring the preservation of all national monuments remarkable for their antiquity, their associations, or their artistic value, another decree was issued constituting a Royal Commission for the purpose of advising as to the repairs required by such monuments. Nearly 200,000 francs are annually voted for expenditure for these purposes. The strict application of these precautionary measures has allowed a number of monuments of the highest interest in their relation to art and archæology to be protected and defended, but it does not appear that the Government controls in any way those monuments which ar in the hands of private persons.

In Holland no statutory provisions exist for this end, but public money to the extent of some five or six thousand pounds a year is spent on preserving and maintaining national monuments and buildings of antiquarian and architectural interest.

Germany likewise lacks statutory provisions with regard to ancient monuments generally, but there would appear to be a growing feeling that steps ought to be taken to protect both them and the natural beauty of the landscapes of the country. Prussia and Hesse are taking steps to control and limit the disfigurement of landscapes by advertisement hoardings ; for it is realised that the interest of all who love beautiful nature is in question, and, moreover, that it would be folly to overlook the pecuniary loss which must accrue if the natural beauty is damaged which attracts the tourist. In Saxony a Commission for the Preservation of Monuments has recently been appointed for the supervision of their removal, restoration, or repair ; and although no right of active protection of monuments possessed by private persons is conferred upon the Commission, I understand that in desirable cases it would be ready to address an official protest to any individual proprietor and to expose him to official pressure and remonstrance in the necessary direction. In Bavaria precautions are taken to protect public buildings which are to undergo repair, but action on the part of the State does not go beyond that point. Plans for any important alterations of a national building, either secular or ecclesiastical, have to be submitted to the Royal Commissioners of Public Buildings and approved by them. A passage from the ministerial order of 1884 with reference to the restoration of churches may be justly quoted :—

" If the restoration of a public building is to be completely successful, it is absolutely essential that the person who directs it should combine with an enlightened æsthetic sense an artistic capacity in a high degree, and, moreover, be deeply imbued with feelings of veneration for all that has come down to us from ancient times. If a restoration is carried out without any real comprehension of the laws of architecture, the result can only be a production of common and dreary artificiality, recognisable perhaps as belonging to one of the architectural styles, but wanting the stamp of true art, and, therefore, incapable of awakening the enthusiasm of the spectator."

And again :—" In consequence of the removal or disfigurement of monuments which have been erected during the course of centuries—monuments which served, as it were, as documents of the historical development of past periods of culture, which have, moreover, a double interest and value if left undisturbed on the spot where they were originally erected—the sympathy of congregations with the history of their church is diminished, and, a still more lamentable consequence, a number of objects of priceless artistic value destroyed or squandered, whereby the property of the church suffers a serious loss." How much richer might we be here in England if only our central authorities had in the past circulated these admirable doctrines !

If we turn to Denmark we find that, as in the case of Belgium, the preservation of immovable objects of historical value has attracted the attention of the Government from the early years of the XIXth century. As early as 1807 a Royal Commission was appointed, whose powers have from time to time been increased. It has no direct control over those monuments which are not the property of the State, but when any particular monument is inadequately protected it has powers of acquisition by purchase. The Government has taken steps to impress upon owners the importance of preserving ancient monuments and upon the incumbents of livings the desirability of protecting the ecclesiastical remains of which they have charge. Steps have also been taken by the Government to prevent removals of stones from monuments of historic interest for utilitarian purposes, such as is causing the rapid disappearance of the remains on Dartmoor in this country. Outside the scope of the Forest Laws, which prevent undue destruction of trees, the Danish Government has not taken any special measures to protect natural scenery as such.

The Government of Sweden and Norway has advanced so far as to have laid down the principle that an ancient monument (the term including long abandoned burghs, castles, monasteries, etc.) may be of such an age that it can no longer be held to be private property. The State Antiquary, acting on behalf of the Royal Archæological Academy, may cause to be raised or repaired fallen stones, notifying his intention to the owner or occupier of the land on which they are situated, and, if necessary, compensating him for damage. The site of such remains may not be cultivated to any increased extent without special permission. Fines are imposed upon anyone who may demolish or disturb ancient relics by blasting or ploughing. Old churches, to which historical memories cling or which possess features of artistic interest, may not be destroyed without the Royal permission.

The Government of the Tsar has not yet turned its attention to this subject, but from a recent announcement one may perhaps conclude that public opinion, in the capital at any rate, is moving in the right direction, for it appears that the City Council of St. Petersburg proposes in future to exempt from taxes those persons who build artistic houses, to confer gold medals on the architects, and to insert a marble tablet on the best façades. The demands of beauty therefore, as well as of utility, are to be encouraged.

In Austria there has existed for the past forty years an "Imperial and Royal Central Commission for the Investigation and Preservation of Artistic and Historical Monuments," constituted for the purposes of inspection and consultation, and in order to quicken the public interest in these matters. It is a central body, in close touch with the Government, and working throughout the country by means of local correspondents or "conservators." It has rights only over those buildings which belong to the State, and has no rights whatever over private property ; but nevertheless its advice is often sought and plans for restoration, etc., submitted to it for correction, and its existence forms an official acknowledgment of the desirability of placing ancient monuments beyond risk of destruction.

The Greeks have stringent regulations to insure the preservation of antiquities, which are regarded as national property, and may on no account be damaged either by owner or lessee. To remove all temptation for the filching of stones it is forbidden to construct a lime-kiln nearer than two miles from any ancient ruins. Should an owner in any particular case refuse to co-operate with the Government in repairs to an ancient monument his interest in it may be compulsorily purchased.

It is said, however, that, while the greatest care is taken of classical remains, the law is not so strictly enforced as might be with regard to mediæval monuments.

In Italy the laws on this subject vary in the different portions of the kingdom, but the most

* A paper read by Mr. Nigel Bond, Secretary of the National Trust, at a meeting of the Dorset Natural History and Antiquarian Field Club.

important law is that founded on the edict of Cardinal Pacca of 1820. Among the regulations contained in it is one forbidding the owners of estates on which ancient monuments exist to do them damage or to make use of them for any common or unworthy purposes. Road mending would appear to be in all countries a baneful source of woe to the antiquarian, and it may be some consolation to us to know that even in Italy it is necessary to take precautions to protect ancient monuments from the highway authorities.

The Swiss Federal Council has appointed a Commission to look after the historic treasures in that country, and makes an annual grant for the purpose, part of which is spent in aiding private individuals in their preservation and another part in their purchase by the State.

Spain has elaborate machinery for the protection of historic and artistic monuments. Each province has a commission immediately dependent on the Royal Academies of History and Fine Arts in Madrid. These commissions give official recognition to the antiquarian or artistic value of public monuments, direct archæological investigations, and prepare catalogues of buildings of interest. Public local bodies have to keep them informed of the condition of classified buildings and of proceedings affecting them. The commissions do not appear to have any absolute power to prevent injury to monuments in private hands, but from their official character and position exercise considerable weight on their behalf.

When we leave Europe, and turn our eyes across the Atlantic to the New World, we have in front of us, of course, a land of natural beauty rather than of historic association; but it is worth while to note that the Americans have in many cases taken steps to secure the preservation in their original condition of the scenes of historic battles, partly as national monuments, partly for purposes of military education. New York State owns Washington's headquarters at Newburgh, and has also acquired the Saratoga monument (originally erected by private subscription) and the lands surrounding it. In many of the States (notably in Florida and North Carolina) the sites of ancient burying-places are carefully protected. With regard to prehistoric remains also, in Ohio, which is one of the richest fields in the world for archæological work, the State partially maintains an Archæological and Historical Society, the purpose of which is to preserve historical material and to afford better care and protection for tumuli and other relics.

The great national parks are, of course, one of the chief features of the country. These are not confined to the neighbourhood of great cities, and in them the natural features of the landscape are placed beyond all possibility of destruction. The best known of these is the Yellowstone Park, whose size exceeds thrice that of the county of Dorset. Twenty years have now elapsed since this great area was set aside as a public recreation ground and as a place of security for all kinds of animal and vegetable life.

Lack of time prevents my making more than a passing allusion to the remarkable work of the Massachusetts reservations. The City of Boston has organised an almost perfect system of open spaces of all kinds, in order that the citizens may enjoy the benefits of natural scenes in the midst of what would otherwise be a vast area of unadulterated bricks and mortar. Over 7,000 acres have been acquired for public parks within the metropolitan area in the last ten years, and these parks are connected with one another by park ways or green lanes, of which there are some twenty-three miles in all, and in addition to this large areas along the river banks are preserved as public open spaces.

Finally, as to Niagara. New York State acquired in 1883, by compulsory purchase, the American portion of the Falls, together with Goat Island and a fringe of the shore in order to effect the preservation of the scenery; and the Canadian Government has, if somewhat more reluctantly, taken similar precautions with regard to the opposite bank and side. It may be mentioned that the movement with regard to Niagara was the outcome of efforts made by the late Lord Dufferin when Governor-General of Canada.

I have now told my tale, though, I fear, without adornment; may I, in conclusion, briefly point to a moral? Our Protectionist friends have not yet subjected the importation of foreign example in legislation to any prohibitive tariff; we are still free to consider whether we could not in some degree follow the direction in which the foreigner has led. Here in England we did not begin to protect ancient monuments by law till 1882, and even then we cautiously experimented upon megalithic remains only. Three years ago the somewhat limited powers of the Commissioners of Works were (by an Act promoted by the National Trust and drafted by its chairman) extended to county councils, and the term "monument" was interpreted to mean "any structure, erection, or monument of historic or architectural interest or any remains thereof." But the State is in the United Kingdom utterly powerless against the owner of even our most important monuments. The powerlessness of the Government has been well exemplified during the last year or two in the face of the determined effort of inexpert enthusiasts to find the Ark of the Covenant among the remains on the Hill of Tara.

I am not one of those who think that we should be the better, either politically or morally, for allowing the State to do the work of the individual. I would infinitely rather see the preservation of places of historic interest or natural beauty carried out by some such association of private individuals as the National Trust; nor do I think that a study of the laws of other countries forces one to the conclusion that excessive State interference is necessary. But I do think that our Government should give greater encouragement to those who have undertaken this work, that it should head the movement in a more determined way than it does at present. It ought to guide and educate public opinion in these matters without, of course, being far in advance of the thoughts and wishes of the people. It seems to me somewhat humiliating that in this year of grace it should be found necessary to form a National Art Collection Fund of voluntary subscriptions because the citizens of the richest country in the world are not willing to provide out of public money sufficient adequately to supply additional art treasures to our National galleries and museums.

Still we need not be without hope. Our Government has recently acquired, and is now taking steps to give proper protection to, the ruins of Tintern Abbey; a clause was inserted in the Irish Land Bill last year with the intention of further protecting the monuments which would probably receive but scant respect at the hands of peasant proprietors. There are, in fact, signs of a change at hand. But we shall do well to remember that our neighbours (in many cases much poorer than us in both relics of the past and the beauties of nature) are much more inclined to give official recognition to the importance of all artistic and historic questions. If we do so, and if we are thereby spurred to greater voluntary effort, our examination of their laws, however inexhaustive, will not have been entirely fruitless.

OSBORNE HOUSE, ISLE OF WIGHT.

THE rearrangement of Osborne House, which was opened on April 6 as the Osborne Convalescent Home, for naval and military officers, has been carried out under the superintendence of Sir Schomberg McDonnell, Secretary, and Mr. Rowland Bailey, Comptroller of Stores, H.M. Office of Works. The entrance-hall and stairway, the Durbar Hall (designed by an Indian architect, Ram Sing), and Queen Victoria's private apartments remain as heretofore; the Victoria Hall (formerly the chapel) is converted into a library for the patients; the visitors' rooms are assigned to the matron and nursing staff; and other apartments have been fitted up for about forty-five resident patients. The late Queen bought the property (376 acres) from Lady Isabella Blackford, together with the adjoining Barton estate (817 acres), five years after her marriage. A subsequent purchase by her of other land increased the property to about 1,800 acres, extending from East Cowes to King's Key. A part of the XVIth century Barton Court house was pulled down, and the rest was restored for the bailiff's residence. Barton Manor, which had belonged since Henry VI.'s day to St. Mary's College, Winchester, was sold by the latter to Queen Victoria. To the former Osborne House was added an outlying wing, on the west side, in 1845-6, Thomas Cubitt being appointed as architect to the Queen and the Prince Consort for the whole work. The wing, 65 ft. square on plan, contained the drawing-room extending along the entire sea-front and divided from the billiard-room by a screen of columns, the dining and other rooms; a lofty campanile, 20 ft. square at base, and having a round teak staircase leading up to the observatory, projects from that front. The floors were constructed of iron girders and brick arches, the chimneys were brought together at the centre, and the flat roof consisted of double brick arches with an intervening space. After a year or so the old house gave place to a block designed to harmonise with the west wing, in the Italian style, faced with cement, and having a rusticated ground-story and a large cornice with consoles. A clock-tower stands at the east end, and the two blocks are connected by a corridor that is continued along all the south side of the later building. The gardens on the water-side, which fall to a vertical depth of some 150 ft., were then laid out with terraces having balustrades and flights of steps. A view and ground-plan of the additions and alterations made by Cubitt are given in our columns of November 25, 1848.

THE ROYAL HORTICULTURAL SOCIETY: 1804–1904.

ON March 7, 1804, the Royal Horticultural Society was founded by the joint efforts of Sir Joseph Banks, R. A. Salisbury, and T. E. Knight, and received a charter of incorporation in 1809. In the course of next July will be completed the new centenary horticultural hall and offices erected in Vincent-square, Westminster, from plans and designs by Mr. E. J. Stubbs. In August last year Sir Thomas Hanbury bought for presentation to the Society the estate and garden, extending over 60 acres, at Wisley, near Woking, of the late G. F. Wilson, F.R.S. In 1821 the Society took a lease, of which sixteen years are still unexpired, at a rent of 300*l.* per annum, of about 33 acres at Chiswick, being part of the market-gardeners' grounds appertaining to Chiswick House, the Duke of Devonshire's seat, and removed thither from their gardens at Kensington (near the Addison-road station) and Ealing. The buildings at Chiswick were designed by William Atkinson and by W. Hurst Ashpitel in 1822-3, and there Sir Joseph Paxton worked as a ground-gardener for a wage of 12s. per week. The Society now occupy only 11 acres at Chiswick, whilst the gradual closing-in of the gardens renders them no longer suitable for their purpose, and the once highly-fashionable *fêtes* have long been discontinued.

The plot of 20 acres of the Gore House and adjoining estates at South Kensington, which the Society rented upon a thirty-one years' lease in 1859 from the Commissioners for the Exhibition of 1851, were laid out, in readiness for the International Exhibition of 1862 (Natural History Museum site), by Sir Henry Cole, R. Redgrave, and Captain Fowke, R.E.; Mr. Nesfield planted the gardens, which were diversified with terraces and slopes to meet the inclination of the ground. In the middle was erected Durham's memorial statue of the Prince Consort, who was elected president of the Society in 1858, and until his death in 1861 did much to retrieve their somewhat untoward fortunes. On July 9, 1859, and December 29, 1860, we published illustrations of the two quadrantal side-arcades which were turned to meet the large conservatory at the north end of the grounds, as designed by Sydney Smirke. After an unsuccessful law-suit between the debenture-holders and the Commissioners the latter felt themselves constrained to exercise their rights of re-entry, and in the result the gardens were gradually altered and encroached upon by the building of pavilions and galleries for the series of annual Exhibitions held in 1871-4, and they were further curtailed for the Fisheries and other Exhibitions of 1883-6. The materials and effects were eventually disposed of in 1887-9, and the site is now traversed by Imperial Institute-road and otherwise covered by blocks of flats, the Royal College of Music, Royal School of Art Needlework, Royal College of Science, and the Imperial Institute and University of London buildings. Five years ago the Society, to which nearly 200 local societies are affiliated, obtained a third charter; they have expended upwards of half a million of money in fostering and encouraging every branch of horticulture, and in the collection both abroad and at home of information and specimens relating to the cultivation and rearing of all kinds of plants and trees whether for useful or ornamental purposes.

LOCOMOTIVE BY-LAWS FOR THE COUNTY OF LONDON.

THE by-laws submitted last month to the London County Council by the Public Control Committee for the regulation of locomotive traffic on highways are very similar to those made by the Council in 1899, but with the addition of by-laws prohibiting or restricting the use of locomotives on certain specified highways and bridges, and requiring a person in charge of a locomotive to give his name and address on demand to a police constable or any authorised official of the Council.

Before definitely agreeing upon their recommendations the Public Control Committee entered into communication with the metropolitan borough councils. Some of these bodies do not view with favour the proposal to limit the use of locomotives in their districts, but several of them find just cause of complaint against traction engines, and many residents in various localities have experienced annoyance and in some cases damage to their premises, from the passage of heavy road engines. Information has also been received by the Committee from the owners of canal and other bridges as to the amount of the loads to which such structures may safely be subjected.

As a result of their deliberations the Committee have come to the conclusion that it is necessary for the Council to exercise the powers of prohibition and restriction conferred by the Locomotive Act of 1898. It may, perhaps, be thought somewhat hard that those who have adopted an improved form of traction should be subjected to regulations from which the owners of heavy horse-drawn vehicles are totally exempt, but the great weight of road locomotives, and the fact that such engines are often used to draw trains of wagons through the streets, are reasons why proper regulations should be formulated. In a cartoon map and five schedules, prepared by the Public Control Committee, are indicated the streets and roads which it is proposed shall be open to this class of traffic. On some highways the use of locomotives is to be restricted to the hours between 9 p.m. and 8 a.m., on account of the crowded state of the roadways; on other highways in residential districts their use will be restricted to the hours between 7 a.m. and 10 p.m., to protect residents from annoyance and inconvenience. In order to provide facilities for through traffic, however, certain highways are to be placed freely at the disposal of road locomotives at all hours of the day and night. A list of some twenty-three bridges is given which will be entirely closed to locomotive traffic, and a second list of some twenty-eight bridges on which the weight of locomotives must be strictly limited to specified amounts. It should be noted that locomotives are to be excluded from all streets and roads not coloured on the map and not indicated by the schedules, but nearly 500 highways will even then be more or less open to such engines, which, it must be admitted, are not particularly suitable for employment in the crowded streets of cities or even in busy suburban roads. So far as we are able to judge after careful examination, the schedules appear to have been drawn with considerable care, and with adequate knowledge of local traffic conditions; and a satisfactory feature presented by them is that the through routes, on which it is proposed to allow the use of locomotives in the County of London outside the city, have been arranged so as to conform with the routes through the city which are available for locomotives between the hours of 7 p.m. and 9 a.m., under the by-laws of the City Corporation.

The by-laws to which we refer will not, of course, apply to motor vehicles, except such as are locomotives within the meaning of the Act.

IMPROVED STREET LIGHTING IN EDINBURGH.—At a meeting of a Sub-Committee of the Cleaning and Lighting Committee of Edinburgh Town Council on the 30th ult., two proposals were under consideration for the improved lighting of the city on those thoroughfares which are not at present lighted by electricity. One motion was that the whole of the streets should be lit by electricity, but the Committee considered that such a scheme was at present unworkable, and that the lighting proposed under it would be quite inadequate. After hearing a report by the Inspector of Lighting, the Committee resolved to recommend, on the lines of a motion by Bailie Mallinson, that within the next five years the ordinary gas lamps of the city should be converted into incandescent light, with square lanterns instead of the present globes.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION:

ORNAMENTAL LEADWORK.

THE tenth meeting of the session was held on the 30th ult. at the new premises of the Association in Tufton-street, Westminster, when Mr. G. P. Bankart introduced the subject of "Ornamental Leadwork" for discussion.

After a lament as to the alleged neglect of the material and a plea for its more general use artistically, the author pointed out that it was capable of being cast, cut, modelled by hammering and beating, engraved, jewelled, inlaid, soldered into patterns with bright tin, modelled, coloured, and gilded. In France and Germany in the Middle Ages it was mostly beaten into shape, coloured and gilt, engraved or painted. England, being the chief lead-producing country, used it more extensively than either France or Germany; but most of the English, unlike the continental work, was cast, with modelled enrichment. They economised solder everywhere, fixing everything in small loose pieces with hooks and loops, with the object of renewing damaged portions without injury to surrounding parts. Towards the end of the XVth century, in France, ornaments made of beaten lead were replaced by decorations cast in stone or plaster moulds. Good work was done in the XVIth century, although the means of fixing and jointing were less studied than in the preceding centuries—the decadence of the art taking place conspicuously in the lapse of the following century. It was observed that change of style in England is shown more clearly in the rain-water heads perhaps than in any other form of leadwork. Lead gargoyles became the favourite playthings, and one at Hardwicke Hall, to wit, was fashioned after the manner of the slit puff of the sleeve of the period. Trough gargoyles were wrought in the semblance of birds' heads and other forms. Rain-water heads—from the simple box form to the combination of the box gutter and outlet all in one—were shown by drawings, and the evolution and developments described. A description of the process of casting lead, patterned and otherwise, in which anything to hand, from a nail head or a piece of wire to patterns made of strips of lead nailed to boards and impressed in the sand mould and afterwards bent or hammered into shape and solder jointed, was next given. All modelled ornament intended for casting in a soft material such as lead should partake of the character of the material, chiefly lying low and away from too ready injury, and not partaking of the nature of carving, although some of the old low relief work was undoubtedly done by pressing carved work into the sand beds. For very slight line and bead work gesso was suitable. Colouring and gilt were largely used. Dutch metal was sometimes substituted for gilt, treated with a preparation of varnish or turpentine and oil to receive the gold, and dressed with parchment size for durability. Another process of decorating lead was by incising the pattern and filling the incised lines with black or coloured wax or mastic.

The discussion which followed the reading of the paper was opened by Mr. M. G. Pechell, and continued by Messrs. T. Fyfe, F. Lishman, L. Ambler, and Mr. L. Weaver, the Special Visitor.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—At a meeting of the Edinburgh Architectural Association on the 30th ult., Mr. A. Hunter Crawford, the President, in the chair, Mr. Thomas Ross, F.S.A. Scot., read a paper on "The Remains and Evidences of Roman Architecture in Scotland." Mr. Ross stated that many evidences still remained of great architectural and engineering works carried out in this country in the first and second centuries, and, although no actual Roman remains now existed in anything like a complete state, still from the numerous plans of Roman buildings revealed by the excavations of the Antiquarian Society of Scotland during the last ten or twelve years, and from the many fragments of details found in these, and in the camp at Barhill, recently searched with so much success, it was now possible to obtain a fair idea of what a Roman station in this country was like, lying four square, with rounded corners, and a gate on the north, south, east, and west, with streets leading from these inward. The buildings within the eight or ten camps excavated were found to be arranged on a definite principle, and before these camps were reached there was no reliable knowledge whatever on this subject. Although no two camps were exactly alike in size, in strength of defence, and in arrangement of buildings, the modifications were seen to be only such as were dictated by local requirements. These modifications were of the same kind and for the same reason as were those found in the arrangements of the cathedrals and abbeys of the middle ages, where, notwithstanding much variety, there was a normal plan. Having described the character of the buildings, Mr. Ross observed that the architectural details found in the ruins had a remarkable likeness to the details of twelfth century buildings, so much so that, were they not beyond suspicion, it would scarcely be credited that they belonged to some time before the third century.

NORTHERN ARCHITECTURAL ASSOCIATION.—The annual report of this Association shows that fifteen new members, eighteen associates, and eighteen students have been elected during the past year, and the numbers are now: Members, sixty-nine; associates, seventy-two; students, seventy-eight; making a total membership of 219, as against 203 in the previous year. A considerable portion of the report is occupied with the liberal gift made to the Association by its past President, Mr. W. Glover, and the arrangements and trust deed under which the expenditure of the money is to be regulated.

MODERN PAINTS.

ONE of the results of the rapid progress and expansion of the chemical and allied industries during recent decades has been that a great increase has occurred in the number of cheap pigments and oils placed at the disposal of the paint manufacturer. The invention of machinery capable of effecting fine and uniform grinding and mixing has undoubtedly resulted in a great improvement in the physical condition of commercial paints, for a paint which when dry exhibits a "gritty" surface is of little value, even though manufactured with materials of the best composition. It is, however, doubtful whether any improvement has been effected during the last half century in the composition of paints generally. Linseed oil, turps, white lead, red lead, red iron oxide, and the ochres, which were so largely used fifty years ago and at a much earlier period still form the basis of the best and most durable paints.

Progress appears to have been made in the art of adulteration and in the manufacture of inferior paints at low prices rather than in the discovery of superior or more durable paints. It is, perhaps, true that such crude adulteration as the use of brick dust or clay is less common than formerly, but, even though adulteration has been raised to the level of a systematic science, it is doubtful whether either the paint user, who buys "genuine" paints at impossible prices, or the manufacturer who sells them, is any the richer for trading with a cheap inferior article in place of one of better quality at a higher price.

Unfortunately buyers who pay on a higher scale with the object of obtaining an unadulterated article often receive precisely the same paint as the purchaser who pays a lower price, for deception is in many cases facilitated by the fact that the buyer omits to apply even the simplest tests to ascertain whether he has received the material for which he has paid. Linseed oil is adulterated with rosin oil or mineral oil, turps with petroleum spirit, and pigments with barytes, chalk, or gypsum; and this adulteration is now so general that it is often difficult to obtain an unadulterated article even though prepared to pay a good price. White lead, for example, for which a high price is paid, is often as heavily adulterated with barytes as that sold at a lower price.

A recent application to six well-known firms for quotations and samples of pure oxide of iron paint, special emphasis being laid upon the necessity for purity of the iron oxide, resulted in the discovery that in only one instance did the pigment approach to commercially pure oxide of iron. In some of the samples barytes was present, and in one case resin and naphtha had also been used. One of the samples contained 50 per cent. of barytes and only 24 per cent. of iron oxide, and the pigment was in such a granular condition that when the paint was spread over a smooth surface and allowed to dry, the surface of the paint was so roughened by the siliceous particles that it was readily

injured by rubbing it with the fingers. In another case a burnt ochre had apparently been used, and although the paint contained 27 per cent. of siliceous matter and only 34 per cent. of iron oxide it could not be said to be adulterated because it was described as "natural" oxide paint, and many natural iron earths contain an even larger proportion of siliceous impurity.

In some cases an adulterated paint may be as good a paint as the unadulterated article, and some manufacturers consider that fact to be sufficient justification for representing the cheap imitation to be the genuine article. Indeed, some authorities contend that the addition of barytes, one of the cheapest of adulterants, to certain paints improves their quality, and that such addition is not, therefore, adulteration. If the proportion of barytes present in the paint were declared when the paint was sold, the addition of this substance in moderate proportion would not, in some cases, be objectionable; but in the writer's experience such declaration is never made.

The chief characteristics of a good paint are that it is sufficiently liquid to be readily applied by brush or sprayer, that it will dry in a reasonably short time and remain firmly attached to the surface painted, that the dried surface of the paint is smooth, impervious, and sufficiently elastic to enable it to withstand ordinary wear and tear without chipping off in flakes. If the linseed oil be adulterated with rosin oil, or other non-drying oil, the drying may be retarded; or the paint may altogether refuse to dry. If the paint be adulterated with rosin or rosin oil it may appear at first to dry satisfactorily, but may subsequently become "tacky" and form a trap for dust. If adulterated with rosin the surface of the dried paint may be so brittle that it is easily scored by attrition.

The oil is the most important constituent of a paint, but the pigment is not merely an inert material possessing decorative value only. In the case of white lead and red lead a chemical reaction takes place between the pigment and the linseed oil, linoleate of lead being formed. Barytes does not enter into chemical reaction with linseed oil, and it is sometimes urged that barytes is, therefore, a better pigment than white lead or red lead, but the lead paints nevertheless still remain in greatest favour with the majority of experienced engineers and builders. There is, however, a great divergence of opinion as to what mixtures produce the best paints, and whilst accepted authorities disagree it is not possible to determine the protective value of a paint by chemical analysis, but it is possible to ascertain whether a specific pigment has been adulterated with some other material of lower market value, or whether the linseed oil has been largely adulterated with rosin oil or mineral oil. It is extremely difficult, and sometimes impossible, to analyse quantitively a ready-made paint, and the analysis can only be performed by an experienced analyst; but the following simple tests which may be made by anyone of ordinary intelligence, will often suffice to reveal the presence of an adulterant.

SIMPLE TESTS.

Drying Power.—Spread paint in thin layer on strip of sheet glass or metal. If the paint does not dry within forty-eight hours it probably contains a non-drying oil. The chief non-drying oils used as adulterants are rosin oil, mineral oils, and fish oils, and any one of these may usually be detected by its odour. Paints adulterated with rosin are liable to crack after a time, and sometimes a paint so adulterated will, after becoming dry, again become tacky. The presence of an excessive proportion of "dryers" is said to sometimes have the same effect.

Odour.—Rub a few drops of the paint between the hands. Rosin oil, fish oil, or mineral oil may be detected by its distinctive odour. If the paint has been thinned with petroleum spirit instead of with turps this may also be detected by its odour.

Ignition.—In a small porcelain crucible place about six drops of the paint. Warm gently by means of gas or spirit flame, and observe odour emitted. Then increase temperature until the oil and spirit ignites, and continue heat until nothing remains but an incombustible ash consisting of the mineral pigment used in the paint. Note colour of the ash.

Examination of Pigment.—When the ash obtained from the foregoing ignition is cold, transfer it to a glass beaker and boil it with an excess of nitric acid. The acid may be strong at first and be subsequently diluted with distilled water. If the pigment was white lead, zinc white, or iron oxide, it will dissolve almost completely in the hot acid, but barytes would remain as an insoluble white powder. Iron oxide would impart a yellow colour to the acid solution. For a detailed scheme for the examination of the principal pigments and the common adulterants see the "Student's Column" of *The Builder*, December 27, 1902.

ADULTERANTS.

The following are the principal adulterants:—

In Turps.—Petroleum spirit, rosin spirit, shale naphtha, coal-tar naphtha.

In Linseed Oil.—Rosin oil, mineral oils, fish oils, cotton-seed oil.

In White Lead.—Barytes (*i.e.*, barium sulphate), chalk or whiting, gypsum, (sulphate of lime), china clay.

In Red Lead.—Barytes, red brick-dust, iron oxide.

In Zinc White.—Barytes, china clay, chalk, gypsum.

In Red Iron Oxide.—Barytes, burnt ochre.

In Vermilion.—Red lead, iron oxide, red lakes.

THE NEW RIVER COMPANY'S OFFICES, CLERKENWELL.

WE read that the Metropolitan Water Board have agreed to acquire, for 9,500*l.*, a portion of the offices in Rosebery-avenue of the New River Company, and that 2,000*l.* of that amount is to be paid in respect of the "Oak Room," which is used for the meetings of the proprietors. On October 6, 1888, we published a view, reproduced from the beautiful little water-colour drawing by Mr. John Crowther and exhibited in that year in the Royal Academy, of the interior of that apartment, which is fitted with carved work, in the classic manner, attributed to Grinling Gibbons. The compartments of the highly-enriched ceiling with plaster decorations contain a painted portrait of King William III. and the coat-arms of Myddelton and of Grene. The richly-carved overmantel, flanked with Corinthian columns, carries William III.'s royal arms with his motto—"Je Maintiendray." The Court Room is on the first floor of the house, built at the New River Head in 1613, and repaired and refronted in 1782 by Robert Mylne, architect and surveyor to the Company. The house was, it is believed, at one time inhabited by Sir Hugh Myddelton, and during a long period formed the residence of the Company's chief officer. The Court Room was embellished as we now see it (*temp.* William III.) by the clerk to the Company, John Grene, who had married Elizabeth, daughter of Sir William, son and heir of Sir Hugh, Myddelton. The decorated ceiling of an adjoining room, which was ornamented by Grene at the same time, bears the date "1693." Of the old house—having two stories, a high roof with attic, and a range of four columns on the ground floor—there is a good view by Antonio Canale, 1753, engraved by Stevens. T. H. Shepherd's water-colour drawings in the Crace Collection depict the original building, and the new house as in 1852. In the "Oak Room" hangs a large print of the buildings as in 1720, showing the old offices, the basin, pond, and waterworks. The offices in Dorset-street, Whitefriars, which, with voluminous records, were burned on November 24, 1769, were rebuilt by Mylne, whose son and successor, R. Chadwell Mylne, designed and built the engine-house and new machinery at New River Head—retaining, however, as we are informed, the base of the "wheel-house"—and at the subsidence-beds and reservoirs in Stoke Newington.

PROPOSED FIRE STATION, ETON.—On the 23rd ult. a public inquiry was held at Baldwin's Bridge, Eton, by Mr. W. O. Meade King, C.E., Inspector to the Local Government Board, into an application by the Urban District Council to borrow the sum of 5,000*l.* for the purpose of acquiring premises in High-street for a new fire station and surveyor's yard. Mr. C. W. Baker, architect, explained to the inspector the designs, plans, and sections he had drawn for the proposed station. Accommodation would be provided for steam and manual engines, cell-room for alarm apparatus, and a hose-drying tower. On the upper floor would be a meeting room for the brigade, with offices, and living quarters for the resident engineer. Mr. Simmonds, Surveyor of the Council, then gave evidence as to the area of the site, and, after further discussion, the inquiry closed.

RECENT ADDITIONS TO THE VICTORIA AND ALBERT MUSEUM.

THE English earthenware from the Jermyn-street Collection has now been classified and arranged. Among the later additions to the pottery section of the museum is a drug-vase, made by Masseot Abaquesne, of Rouen, in the XVIth century; and a rare porcelain bowl with decoration in the style of Rhodian earthenware, made at Florence or Pisa, and dated 1638. The collection of pewter has been enriched by some new gifts and loans. In the water-colour galleries will be found three bronze statuettes by Mr. Alfred Gilbert; the well-known "Perseus Arming"; a figure called "Comedy and Tragedy," representing an actor holding a mask; and a statuette entitled "An Offering to Hymen," a young girl holding in her hands a winged figure and a stem of flowers. In the same gallery is a replica of Rodin's marble figure in the Luxembourg, Paris, "La Danaïde." At the end of the Prince Consort gallery, near the collection of illuminated manuscripts recently given by Mr. George Reid, cases of manuscripts are now shown for a short time. Prominent among these are a fragment of a Northern French Book of Hours, of the end of the first half of the XVth century; and a German manuscript of the XVIth century, with exquisitely-painted flowers, butterflies, etc., and two naturalistic landscapes.

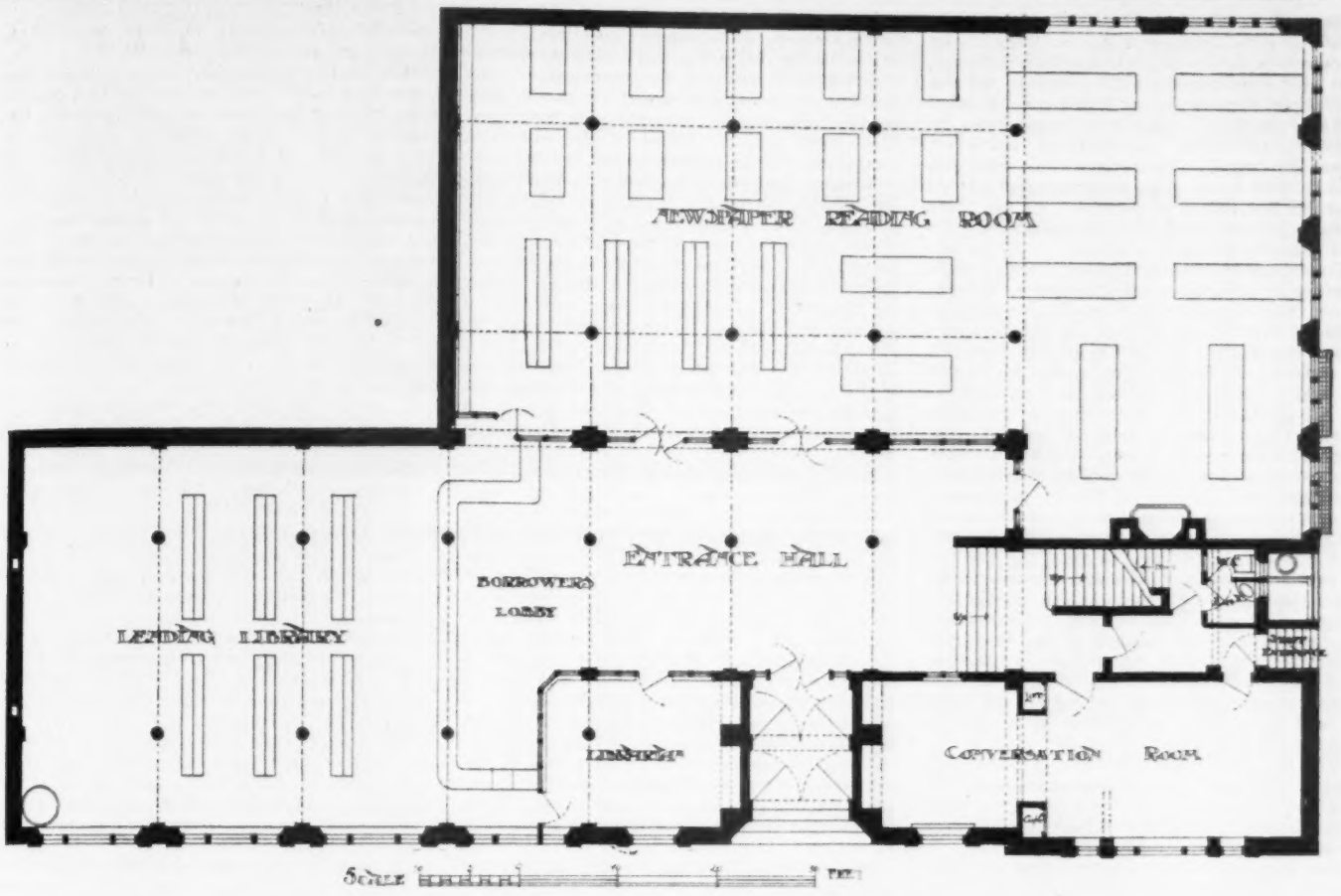
In the furniture section are two carved wood coffers of Tyrolese and South German work, dating from about 1500, of a style scarcely represented hitherto in the museum collection: also an oak bed-front from the North of Europe, probably XVIIth century work.

Amongst the vestments exhibited in the East Cloisters of the North Court will be found two dalmatics and a chasuble of the later years of the XVth century, said to have come from the Church of St. Severin, at Cologne; they are of stamped woollen velvet, with embroidered orphreys. In an adjoining case is a mauve coloured velvet cope, decorated with appliqué work and embroidery; on the hood is represented the Virgin and Child, whilst Our Lord in glory appears in the middle of the orphrey, with St. Peter, St. Bartholomew, and St. Ursula to the right, and St. Paul, St. John the Evangelist, and St. Andrew to the left beneath canopies. This splendid example of ecclesiastical embroidery is German work of the early XVIth century. At the end of the South Court, in a case facing the lace collection, is hung an altar-frontal in three panels, which is a characteristic piece of Flemish pillow-lace of the XVIIth century, with bold scrolling patterns united by brides picotées. The smaller articles of costume, which are grouped in a large case at the foot of the Art Library staircase, have been enriched by an embroidered silk bodice with slashed sleeves, probably made in Italy during the early years of the XVIIth century.

Some Tudor tapestry hangings, which for many years were on the walls of the audit-room of Winchester College, have been lent by the Warden and Fellows of the College and are exhibited in the Tapestry Court, where they will remain for a few days longer. Two of these hangings form part of a tapestry of great beauty, and are unusual in design. The field is in broad, vertical stripes of red and blue covered with a pattern, over which are the following devices repeated:—The Sacred Monogram, red and white roses, and shields azure, three crowns or. Two other examples form portions of a large tapestry which had for its subject the story of David and Abigail. The tapestry is a Flemish production of the second half of the XVth century. Another tapestry, less important in its character, has the advantage of being complete. It represents a group of figures, enclosed by a border of fruit and flowers. It was most probably woven at Brussels soon after the middle of the XVIth century.

In the Indian section of the museum is an interesting collection of personal ornaments worn by native women, chiefly bracelets, armlets, anklets, and toe-rings, in white metal and brass; for the most part they were found in Central India and the North-West Provinces. They are the gift of Miss E. M. Herbert Wright.

THE QUANTITY SURVEYORS' ASSOCIATION.—The Council of this Association met on Monday, March 28, to consider the application forms which had been forwarded to the Hon. Secretary from gentlemen desirous of being elected to membership. The by-laws of the Association insist on stringent inquiry being made by the Council of intending members, as to training and practice qualifications under Clause 5 of the Articles of Association. It was resolved by the Council that out of 133 applicants considered, 81 be voted as eligible, 32 be referred for further particulars of training etc., and 20 be rejected.



New Library, Keighley. Plan of Ground Floor.

Illustrations.

MEMORIAL CHAPEL, RIFREDI, FLORENCE.

THIS is a chapel erected in the churchyard at Rifredi, near Florence, from the designs of Signor Castellucci, architect, of Florence.

Signor Castellucci, we may mention, is one of the architects to the "Officio per la Conservazione dei Monumenti" at Florence, and it was he who, in conjunction with Signor Guido Carocci, the editor of *Arte e Storia*, worked out the design which, last year, obtained the first prize in the competition instituted by the "Accademia di Belle Arti," and the City of Florence for the best design for a better communication between the old centre of Florence and the left bank, by way of the Ponte Vecchio.

The chapel is built in the grey sandstone of Fiesole, called Pietra Serena. The walls are partly decorated in *sgraffito*. The pavement is in white marble inlaid with green and red marble (*verde di Prato* and *rosso di Maremma*).

The ceiling is in red terra-cotta, with blue ground to the panels, and relieved with gold; the interior frieze is treated in the same manner.

The roof is of thick slate from the quarries of Lavagna.

The whole cost of the work was about 11,000 *lire*.

The drawings for every detail were made full size by Signor Castellucci, who also carved in chalk the models of all the ornaments in relief. These ornaments were executed by Guiseppe Batistoni and Camillo Signori, carvers; the *sgraffito* by Vittorio Mugnai; the terra-cotta is from the manufactory of Signa; the bronze railing was executed by Tortoni, of Fiesole; the stained glass by Federigo Mossmeyer, of Florence; and the masonry by Egisto Salvadori.

NEW POST OFFICE, LAHORE.

THIS drawing shows part of a design submitted in competition for the above. The plans were prepared by the engineers of the P.W.D., architects being required to furnish elevations only. The materials to be used were brick and terra-cotta.

The drawing was exhibited in the Royal Academy last year.

M. STARMER HACK.

ENTRANCE TO NEW LIBRARY, KEIGHLEY.

THE new library at Keighley, near Leeds, is now being completed at a cost of 10,000*l*. The building occupies a corner site, with a frontage of 133 ft. to the main thoroughfare. It contains accommodation for 40,000 volumes, and includes a news-room 86 ft. by 40 ft. and a reference library 100 ft. by 38 ft.

In the exterior walling local stone of various quarries is used to obtain broken colour.

The contractors were:—Stonework, Messrs. Waddington Brothers; carpentry, joinery, and oak fittings, Messrs. Driver and Son; constructional ironwork, Mr. Jonathan Gill; heating and ventilation, Messrs. Dargue Griffiths.

The work has been carried out under the supervision of Messrs. Arthur E. McKewan and James A. Swan, of Birmingham, joint architects.

The drawing here illustrated was exhibited at the Royal Academy in 1902.

We give the plan of the ground floor. The first floor is occupied by the reference library (facing the longer frontage) and the patent library (over the shorter return front); the other portions of the plan, included in the angle between the two front blocks, are in one story only and top-lighted.

HOUSES, HIGH-STREET, MARYLEBONE.

THIS front, combining a house and two shops into one design, is by Mr. W. M. Button.

MOSS COTTAGE, PINNER.

THE drawing represents the latest state of a rambling old half-timbered country house which has been added to from time to time.

The latest alterations, carried out under the superintendence of Mr. W. H. Seth-Smith, have consisted in the addition of one or two rooms and the formation of a new hall.

BUSINESS PREMISES, HIGH HOLBORN.

THESE premises are built of Portland stone, and devoted to a shop on the ground floor and offices over.

They form part of the improvements involved in the new Kingsway scheme, a part of the old Kingsgate-street being absorbed in the site. Mr. A. Sykes is the architect.

COMPETITIONS.

KING'S COLLEGE HOSPITAL NEW BUILDINGS.—The Building Committee have appointed the following architects to take part in the competition for the appointment of architect of the new buildings at Denmark-hill: Mr. E. T. Hall, Mr. A. Saxon Snell, Mr. J. H. T. Woodd, Mr. W. A Pite, Mr. W. Harvey, and Messrs. Campbell Douglas, and Paterson. Mr. Rowland Plumbe will act as assessor in the competition. The estimated initial expenditure is 300,000*l*. for buildings to accommodate 600 beds.

QUEEN VICTORIA MEMORIAL SCHOOL, SCOTLAND.—The appointment is announced of Mr. J. A. Campbell, of Glasgow, as architect of the proposed Memorial School for the Sons of Scottish Sailors and Soldiers. The Committee selected Mr. Campbell as their architect after consideration of various designs and plans submitted in competition.

Books.

Automatic Surveying Instruments and their Practical Uses on Land and Water. By THOS. FERGUSON, Member of the Shanghai Society of Engineers and Architects; with an introduction by E. Hammer, Ph.D., Professor of Geodesy at the Royal Technical High School of Stuttgart. London: John Bale, Sons, and Danielsson, Ltd. 1904.

ENGINEERS who have been occupied in surveys abroad often have useful suggestions to make with regard to surveying instruments more especially adapted for use in undeveloped countries. In the little book now before us we find a series of notes intended to bring together, for convenient reference, all information of practical value concerning certain types of automatic surveying instruments. The first instrument described is termed the "pedograph," an automatic route-tracer for pedestrians. As our readers are aware, various instruments are made by which pedestrians are enabled to make rough measurements of distance. In the pedometer a dial indicates the distance traversed in miles, the measurement being based on the assumed length of each step taken by the user; in the passometer the number of paces is indicated, thus leaving the operator to calculate the average length of his steps. Each type of instrument,

as made in this country, resembles an ordinary watch in size and appearance, so that it can be conveniently carried. It happens, however, that in these watch-like contrivances the oscillating hammer is so delicately balanced and so light that it is apt to rebound and so to register more than the distance traversed, unless the user is very careful. Mr. Ferguson tells us that when using an instrument of this type he has found it possible "to assume a certain gait at which the instrument registers two paces for every step taken."

Consequently, his attention was turned to the production of a more reliable device, and the result was the invention of the pedograph. This is certainly far more serviceable than other instruments made for similar purposes. It consists of an oscillating frame, the motion of which causes a step-by-step progression of a ratchet-wheel, actuating a recording device which draws a facsimile of the route pursued upon a sheet of paper fixed in a frame, pivoted so that it can be adjusted to suit any deviation from the original line of progression. The apparatus is enclosed in a case measuring 12 in. by 12 in. by 2½ in., and is provided with a compass and spirit-level to assist the operator in obtaining accurate results. It is evident that this is a far more reliable instrument for practical work than ordinary step-measuring appliances, and the author shows that considerable accuracy is obtainable in practice. The pedograph should be especially useful for military and preliminary surveys of all kinds, as well as for filling in the details of rigorous topographical work.

The next instrument described is the "cyclograph," intended for the same purpose as the familiar "perambulator," but it is a more scientific instrument and suitable for adaption to a bicycle. The apparatus is contained in a flat box, and is so contrived that the path followed is traced on paper under the eyes of the observer. This instrument is, of course, far more accurate than the pedograph, and it is perfectly suited for use in any country where a bicycle can be ridden or pushed. Although the only practical results have been obtained from a series of tests made with a working model, these are sufficient to show that the instrument possesses great possibilities. In a series of trials made by the author in Holland, over fairly good country roads, a route was traced, measuring some six and a half miles long, at the rate of nine miles an hour, which appears to beat all previous records for rapid road surveying. With some minor alterations, the cyclograph can be adapted for use in hydrographic surveys, the containing box being then increased in dimension so as to provide accommodation for a larger sheet of paper.

The third instrument described by Mr. Ferguson is termed the "hodograph," which was designed by him as an aid to the mapping of various intricate systems of waterways in China. This instrument is intended to be fixed on a boat, and is driven by a propeller fan trailed in the water like a ship's log. Distances and directions are automatically traced upon an ordinary sheet of paper. The hodograph seems to be a most useful apparatus, and although not perfectly automatic it requires very little attention. The results cannot be so accurate as those taken by an instrument used on land, as various errors are necessarily caused by variations of current, leeway, and unequal slip of the propeller. Nevertheless, there are many places and circumstances in which it could be used with great advantage. We quite agree with the remarks made in the preface by Professor Hammer that the instruments described ought to be very useful in those branches of surveying which are comprised within the term geographic surveying. The book is clearly written and adequately illustrated, and we believe it will be of real service to surveyors practising abroad, as well as to students who wish to qualify themselves for work in the Colonies and foreign countries.

Strength and Elasticity of Structural Members. By R. J. Woods, M.E., Mem.Inst.C.E., Fellow and Assistant Professor of Engineering, R.I.E. College, Cooper's Hill. London: Edward Arnold. 1903.

This work is the outcome of a series of lectures for students at the Royal Indian Engineering College, Cooper's Hill, and the aim of the author has evidently been to present theories and facts in a strictly practical manner, using simple and concise methods such as do not require more than an average knowledge of elementary mathematics. In dealing with a subject of this character it is obviously impossible for any writer to be original, unless he has been so fortunate as to discover some new law, or some hitherto unknown application of an old one. In the volume now under consideration the chief merit may be found in the admirable arrangement of the subject matter, and the lucid treatment pursued from beginning to end. As a preparation for the work to follow, the author gives in Chapter I. an excellent summary of the principles involved in Graphic Statics, accompanied by a number of diagrams illustrating the resolution of forces and the action of stresses in simple members and framed structures. The treatment of roof trusses in this chapter is very complete, dealing with applied loads and wind pressures on various types of roof construction, and showing the manner in which stress diagrams may most conveniently be constructed. The three succeeding chapters are chiefly devoted to definitions of Stress and Strain, Stress-Strain Diagrams, Working Stress, Resilience, and Compound Stresses, the whole of this being most necessary preliminary matter. Attention is next devoted in Chapter V. to Bending Moments and Shearing Forces, and here we notice that some of the diagrams are so drawn as to be even more intelligible to the student than those occurring in ordinary text-books. After elucidating methods of finding the moments of inertia of rectangular, triangular, and circular areas about different axes, Mr. Woods passes on to the consideration of stresses in girders, and in Chapter VIII. treats fully of the deflection of beams. An important point raised in the succeeding chapter relates to non-axial loads, the influence of which, we fear, is not always taken sufficiently into account in the preparation of designs. The same chapter includes some useful problems relating to the stability of masonry structures—such as dams, piers, and retaining walls—and the working out of the solutions is adequately illustrated by diagrams. A very short chapter is allocated to the subject of columns and struts, which really deserves more adequate treatment. The author confines himself chiefly to the elucidation of the well-known formulæ of Gordon and Rankine, neither of which express with any precision even the average results obtained from experimental investigation. Brief reference is made, it is true, to Professor Johnson's formulæ, but this chapter cannot be said to be entirely satisfactory. After dealing with riveted joints, the author proceeds, in Chapter XII., to consider various points in connexion with continuous girders, giving rules for determining the maximum bending moments in each span, the bending moments at the different supports, and the points of inflection. As continuous girders very frequently appear in building construction, this chapter should be a very useful one for architectural students. Chapter XIII. is a very brief discussion of cantilever bridges, suspension bridges, and arched ribs, and the concluding chapter deals with the theory of torsion, or twisting, a subject more particularly interesting to mechanical engineers.

In addition to examples worked out by the author, each chapter contains a number of exercises on the application of the principles therein explained. It will be seen, therefore, that the work is essentially adapted for the use of students, to whom it may be confidently recommended as a reliable guide.

Proceedings of the Incorporated Association of Municipal and County Engineers. Vol. XXIX.; 1902-1903. Edited by Thomas Cole, A.M.Inst.C.E. London: E. and F. N. Spon. 1903.

This volume contains papers on municipal work at Shipley, West Bromwich, Aldershot, King's Lynn, and Sudbury, and of these particular mention may be made of the exhaustive and clearly-illustrated paper by Mr. A. D. Greatorex on municipal work at West Bromwich. Of more general interest is the series of six papers on the ventilation of sewers and drains. They show that some municipal engineers are despairing of a satisfactory solution of this problem being found. One of the six authors seems to think that the necessity for ventilating sewers has not been proved, and three others advocate the abolition of the intercepting trap in order that house-drains and soil-pipes may serve as sewer-ventilators. This is not the first time that municipal engineers have expressed a desire to shift their responsibility for the ventilation of sewers on to the shoulders of architects, builders, and building-owners, and we must again strongly object to the proposal. In the discussion on the papers Mr. T. de Courcy Meade, the City Engineer of Manchester, very wisely said:—"I think it is to be regretted that younger members and graduates who are present to-day should hear so many seniors propose the abolition of the intercepting trap; it is a very dangerous principle to advocate, and I have risen simply to enter my protest against it; it is unscientific, and it is not the remedy for unventilated sewers." The volume contains two short papers on the bacterial treatment of sewage, by Dr. F. Clowes and Mr. W. D. Scott-Moncrieff, and others on "Trees in Public Roads," "Cremation," etc. It is clearly printed, and is altogether an interesting record of the Association's proceedings during the year 1902-3.

Paint and Colour Mixing: A Practical Handbook for Painters, Decorators, and all who Have to Mix Colours. By Arthur Seymour Jennings. Second Edition. London: E. and F. N. Spon. 1904.

The principal additions made in this edition of "Paint and Colour Mixing" consist of a chapter on washable and other water paints, a chapter entitled "Notes on Colour Harmony," and a short chapter on the mixing of colours with black japan. The number of plates constructed of strips of painted paper, representing the principal colours on the market, has been increased from four to eight, giving altogether examples of 171 colours.

The author is of opinion that house painters do not use black japan in coloured paints to the extent it deserves. Black japan mixed with orange chrome forms a chocolate brown, with lemon chrome a neutral green, and with Indian red a rich dark red. But the proportions to be used in producing these colours are not stated, and the mixer must experiment for himself with the mixtures until he obtains the desired tint.

In the chapter on "Greys and Grays" the author defines a "grey" as an admixture of black and white, while a "gray" is an admixture of black and white to which a colour has been added, but in which the black and white still predominate. This is not a good method of distinction, for the pronunciation of the two words is the same, and when making verbal inquiry for the desired colour it would be impossible to distinguish between "grey" and "gray."

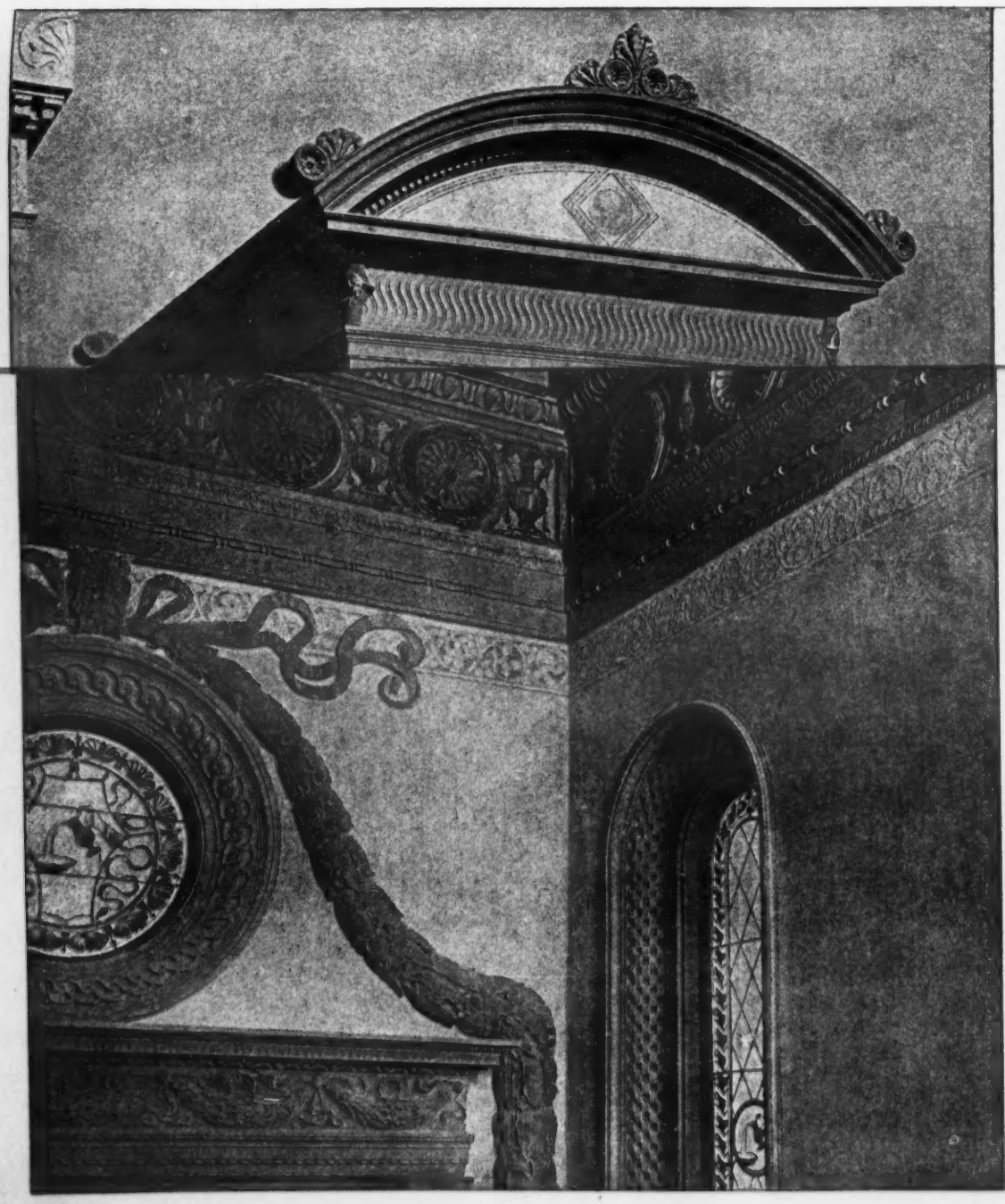
Some portions of the book are written in the style of an advertising circular rather than in that of an instructive technical work. For example, the paragraph headed "Fireproof Paint" gives no information concerning the composition and manufacture of such paint, but merely gives the name and address of a firm which manufactures a fireproof paint. The same objection applies to the paragraph headed "Filling Up."

The book, however, though not a large one, contains much information and suggestive matter. Architects and builders will find it useful for reference purposes.

Modern House Drainage. Plans and diagrams by Gerard J. G. Jensen, C.E. The Sanitary Publishing Company, 5, Fetter-lane, E.C. (No date.)

This publication consists of two sheets of drawings mounted on cloth and folded to fit into a cloth case. There is no letterpress. Sheet 1 contains illustrations of soil and waste pipes, and the methods of connexion to water-closets, lavatories, sinks, and bath. Four gully traps of different kinds and some other details are also given. The diagrams are clear, and show good types of plumber's work, but it is a pity that neither scales nor figured dimensions are inserted. The wiped joint between one of the sink traps and the waste pipe is incorrectly shown. Sheet 2 contains the ground-floor plan of a house with a complete and well-designed system of drainage, a longitudinal section of the main drain, and details of the manholes, air-inlets, etc. The general plan is drawn to a scale of about 16 ft. to an inch, the section is slightly larger but no scale is shown, and the details are drawn to two or three different scales, but here again there are neither scales nor dimensions. The soil-pipe described as E in the "Reference" is not lettered on the plan, and the number 7 is omitted from the title of one of the air-inlet details. These are perhaps trifling defects, but they certainly detract somewhat from the value of the drawings.

THE BUILDER, APRIL 9, 1904



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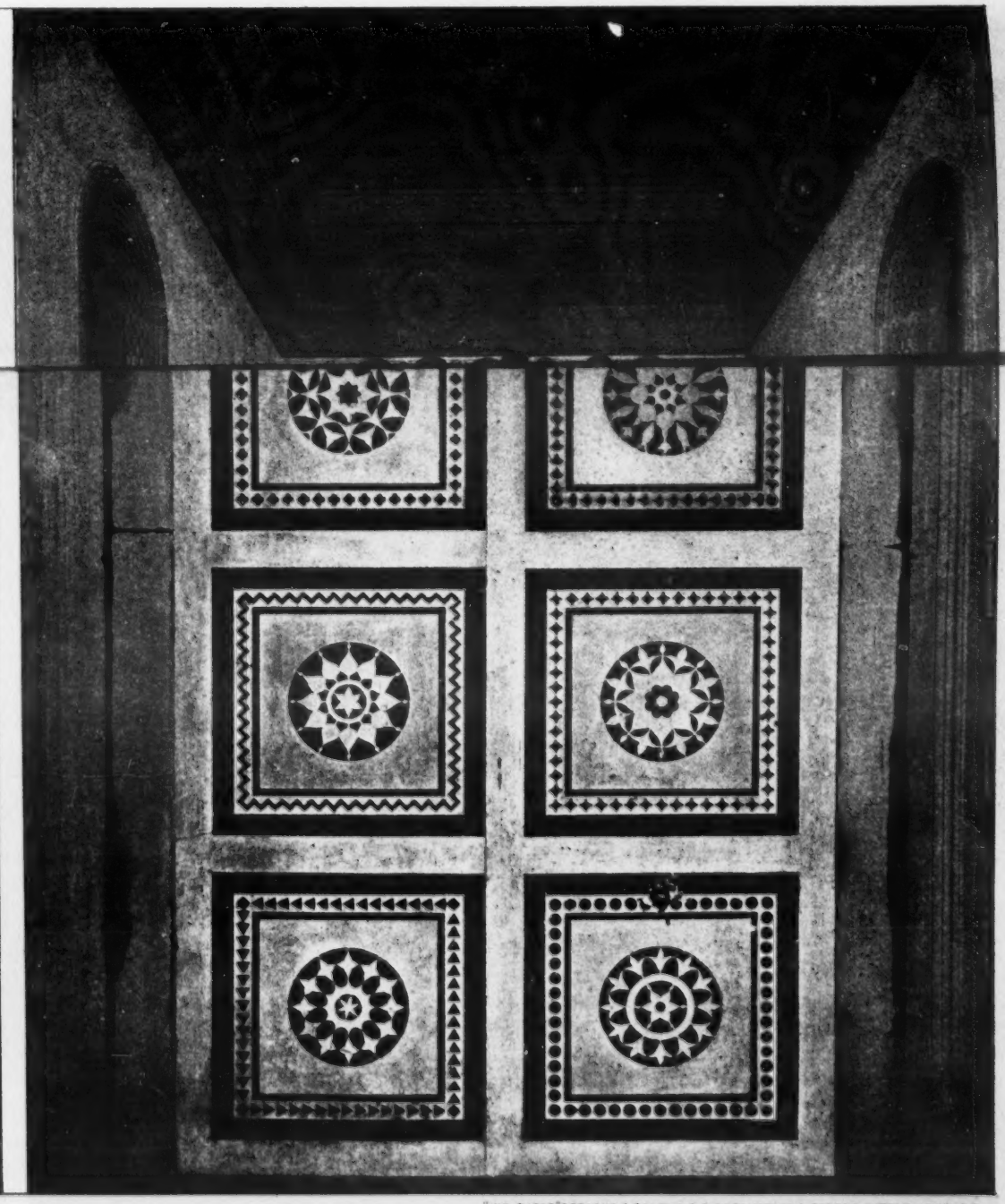

PLAN OF FLOOR.

MEMORIAL CHAPEL IN THE CHURCHYARD, RIFREDI, NEAR FLORENCE.—SIGNOR CASTELLUCCI, ARCHITECT.

PHOTO. SPRAGUE & Co. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

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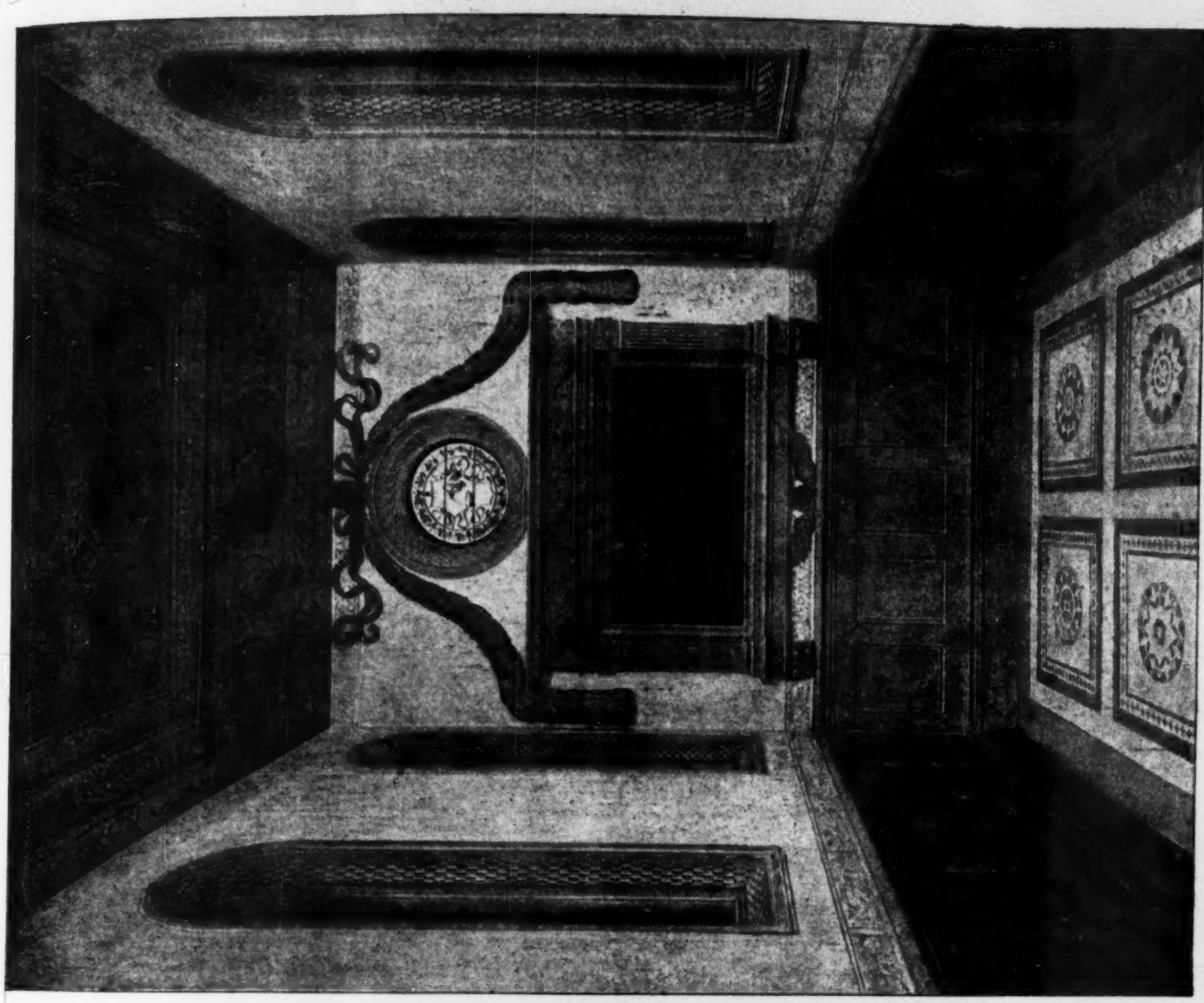
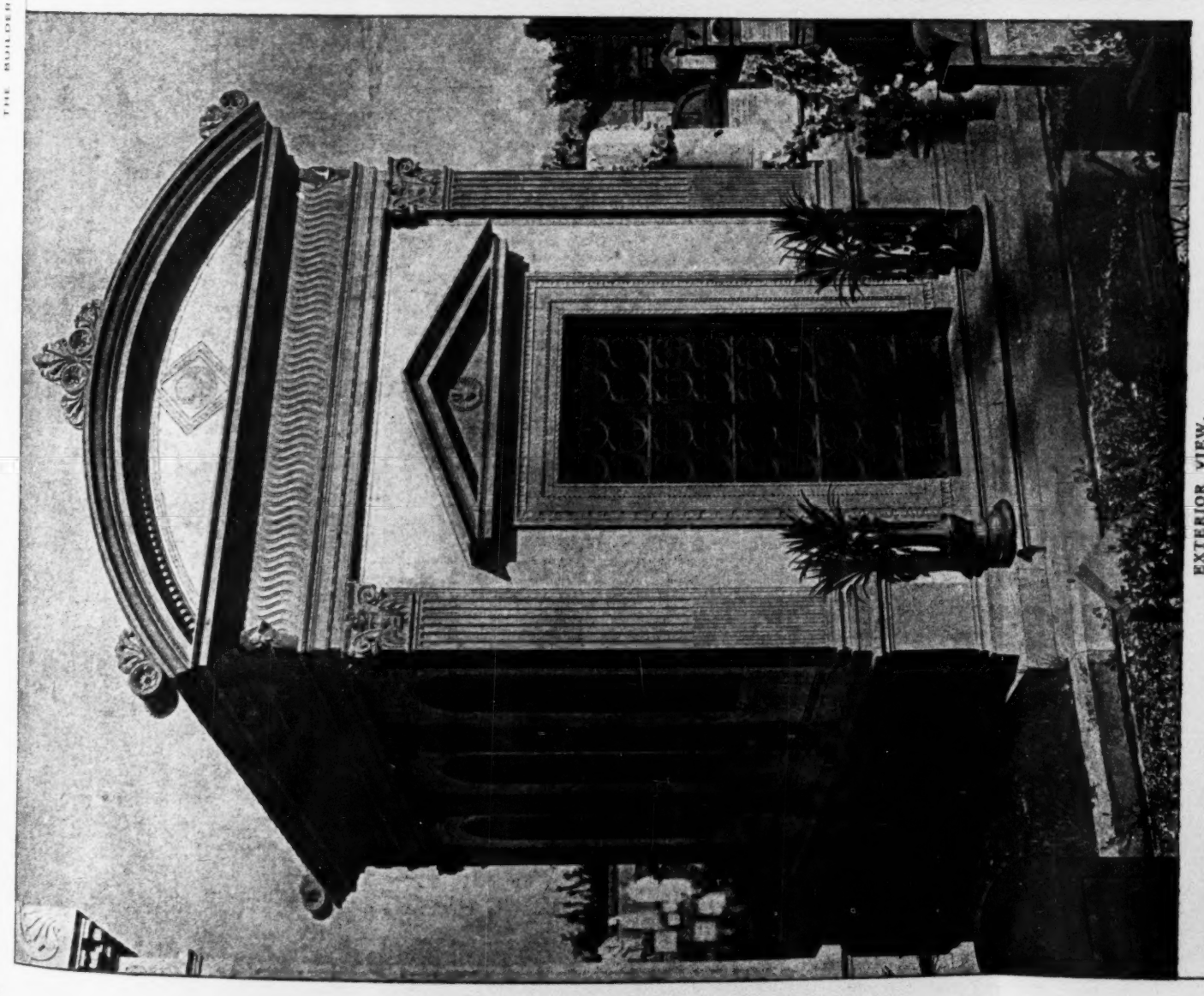
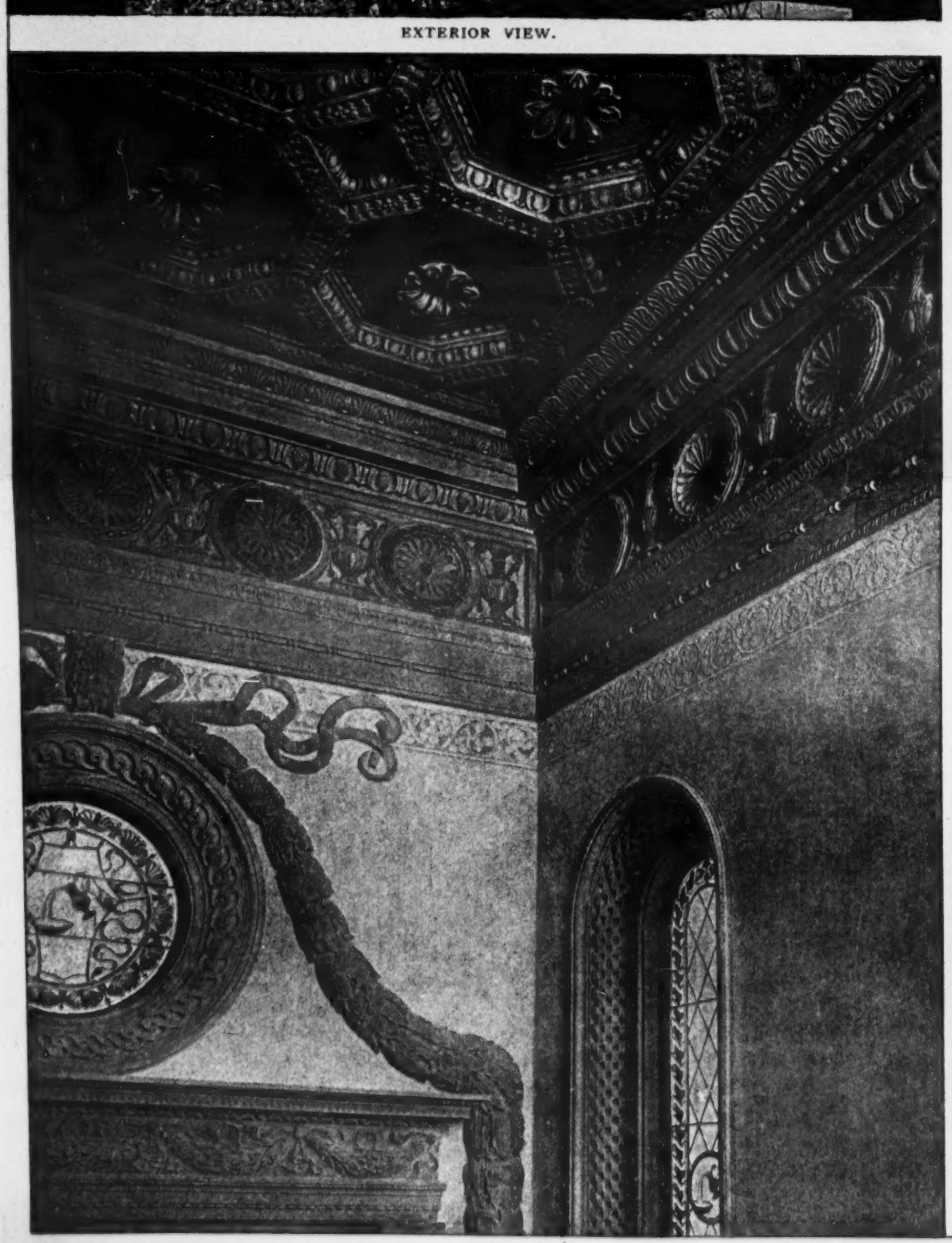


INTERIOR VIEW.



EXTERIOR VIEW.



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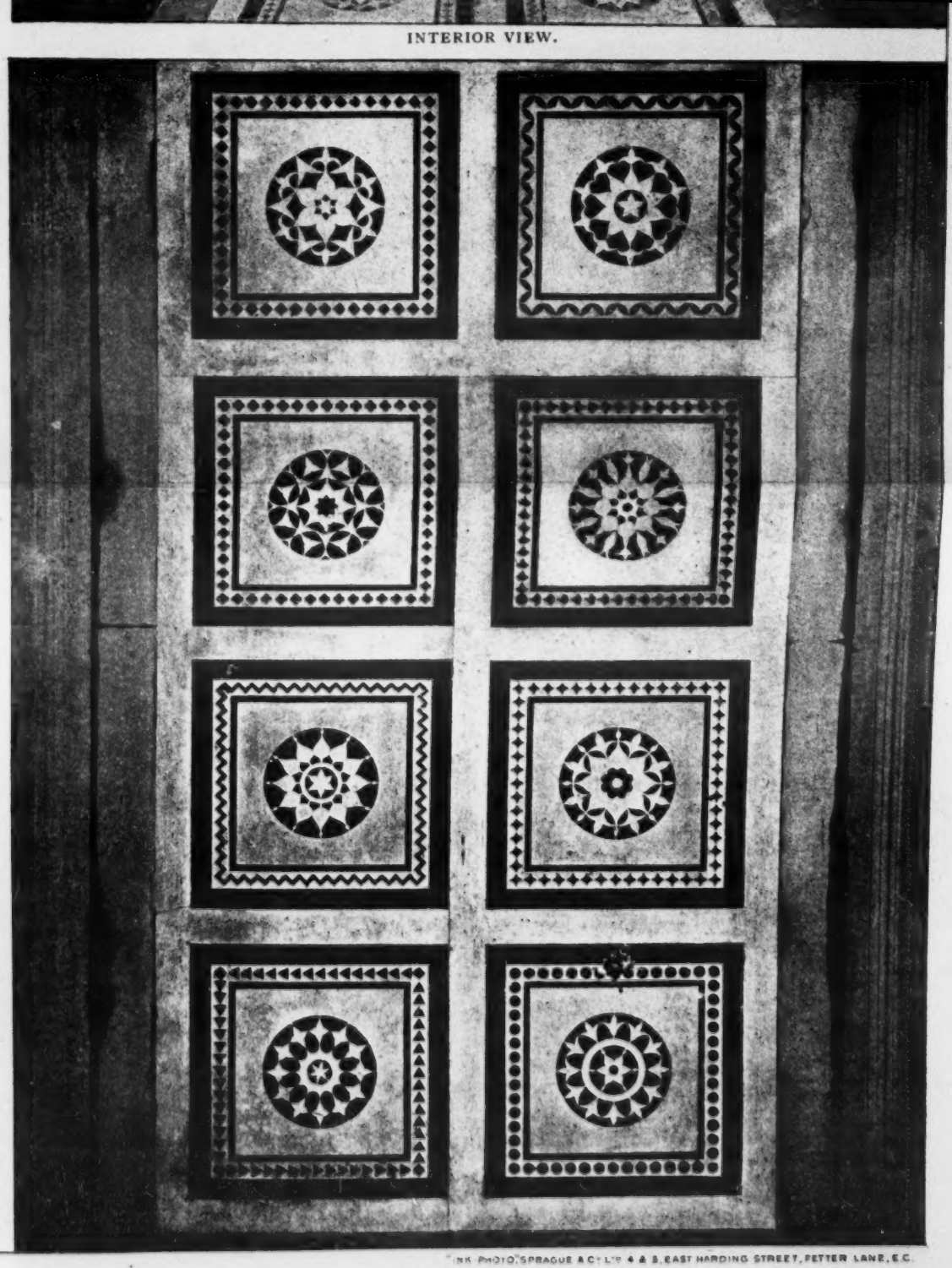


INTERIOR VIEW.

DETAILS.

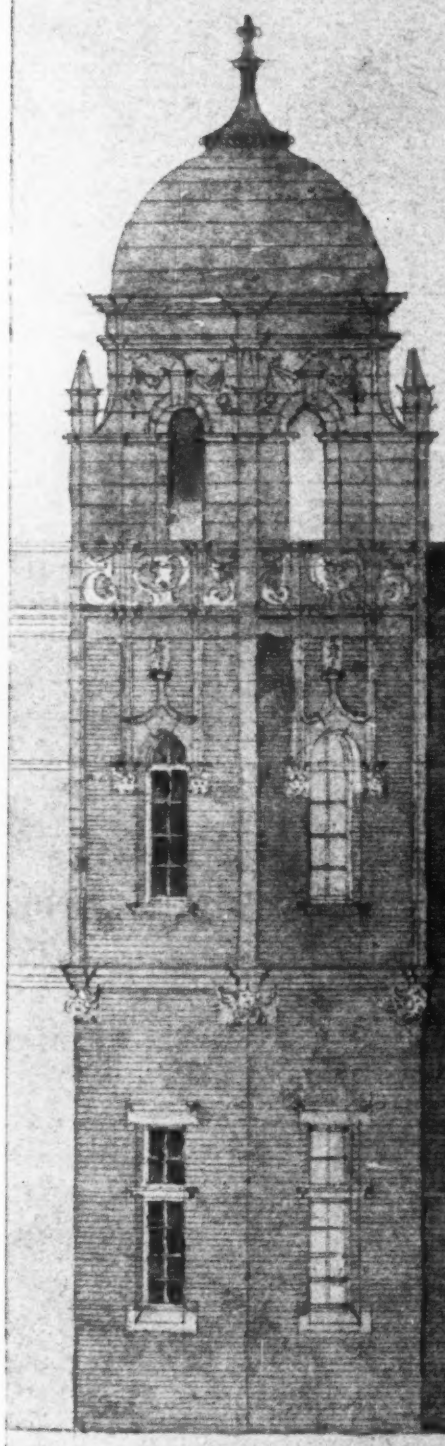
PLAN OF FLOOR.

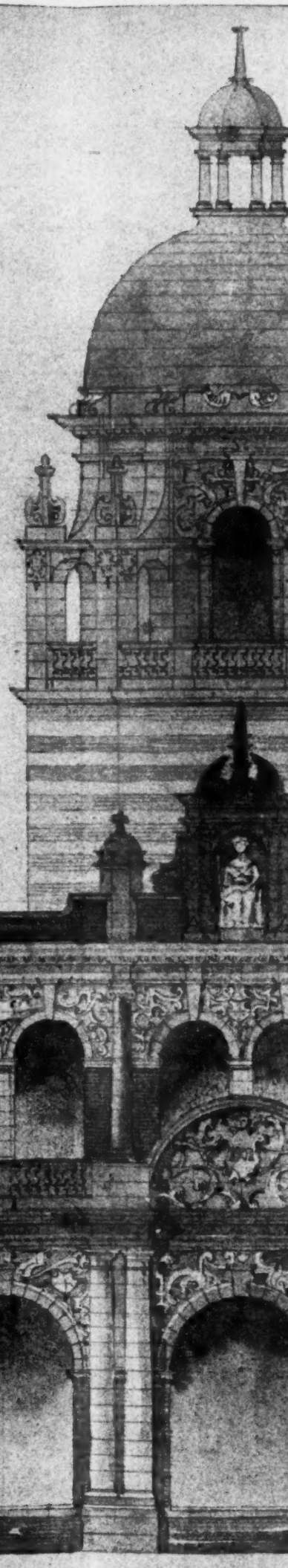
INK PHOTO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

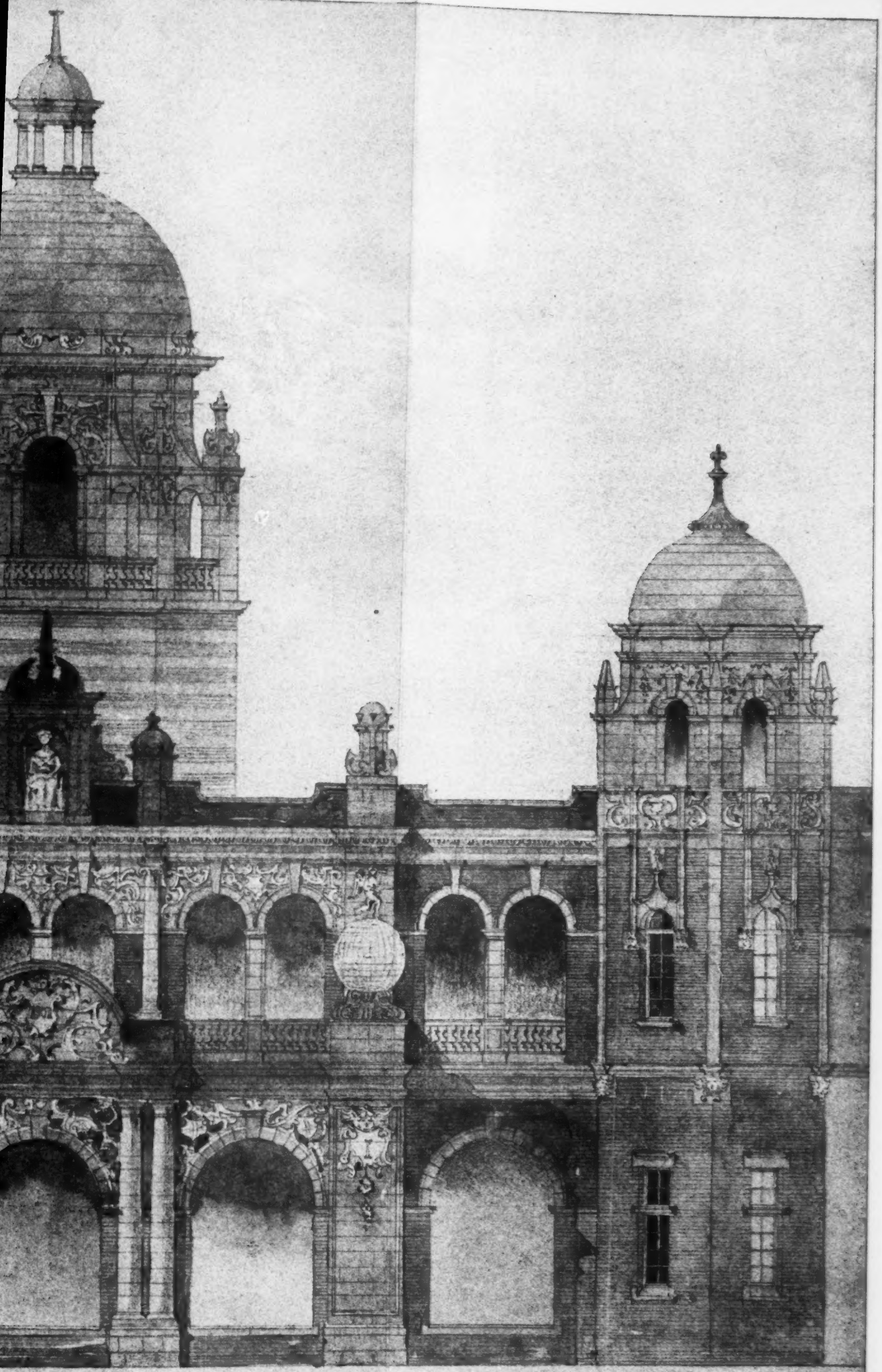
MEMORIAL CHAPEL IN THE CHURCHYARD, RIFREDI, NEAR FLORENCE.—Signor Castellucci, Architect

Design for the Entrance to New Post Office Lahore.

PLAN







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M. Stormer Hack A.R.I.B.A.
Architect
London and Bombay

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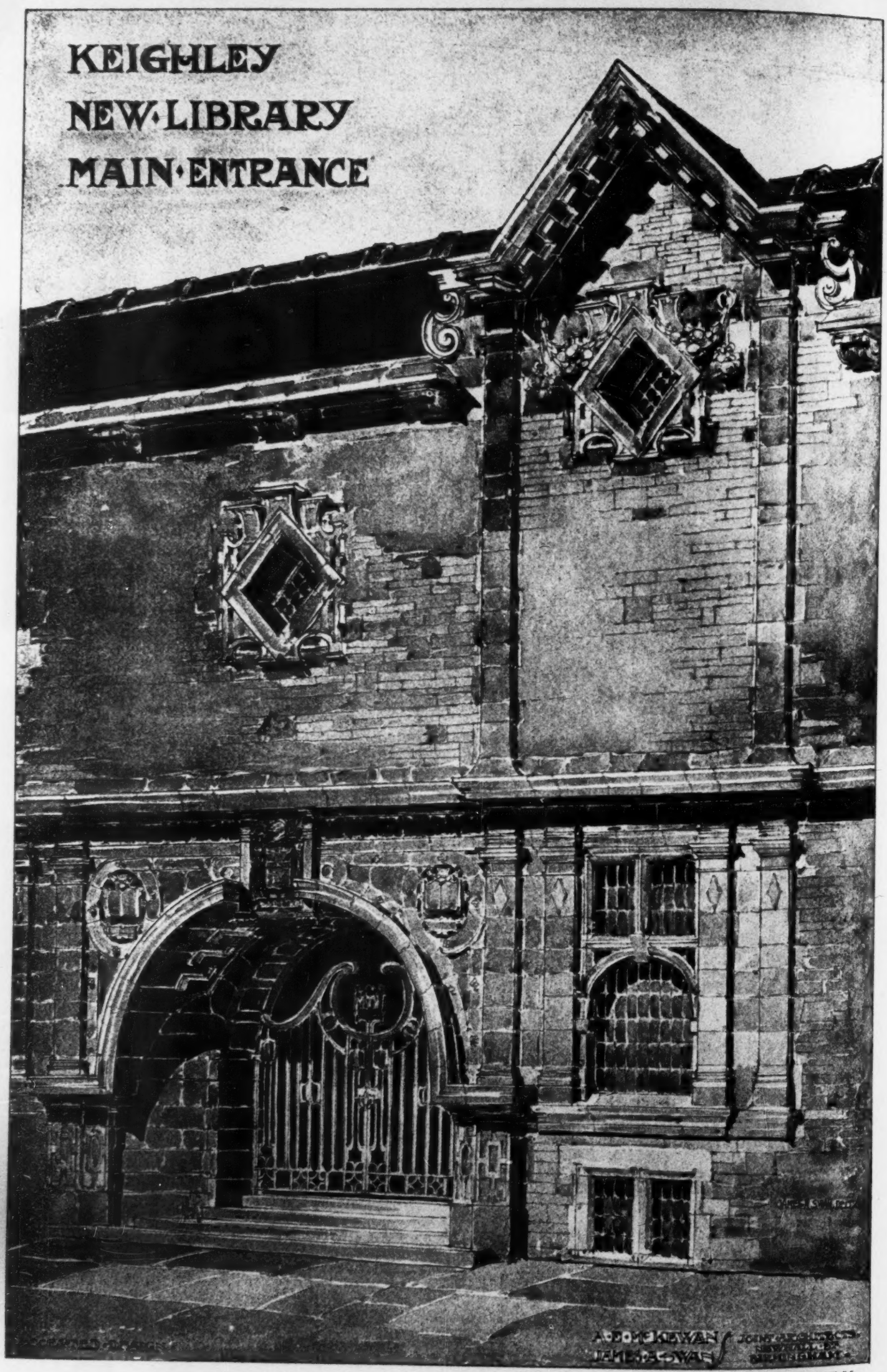
KEIGHLEY NEW LIBRARY MAIN ENTRANCE



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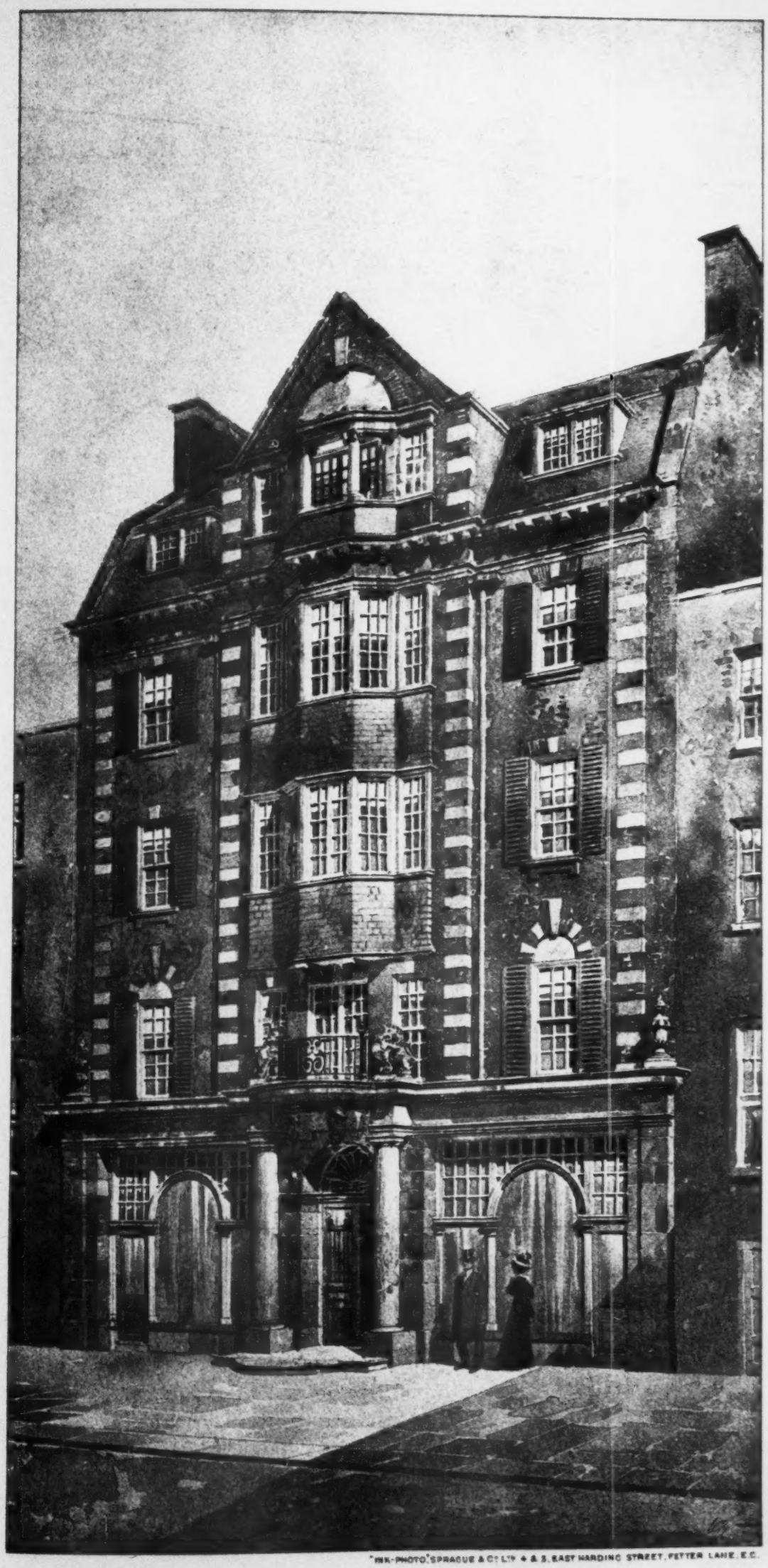

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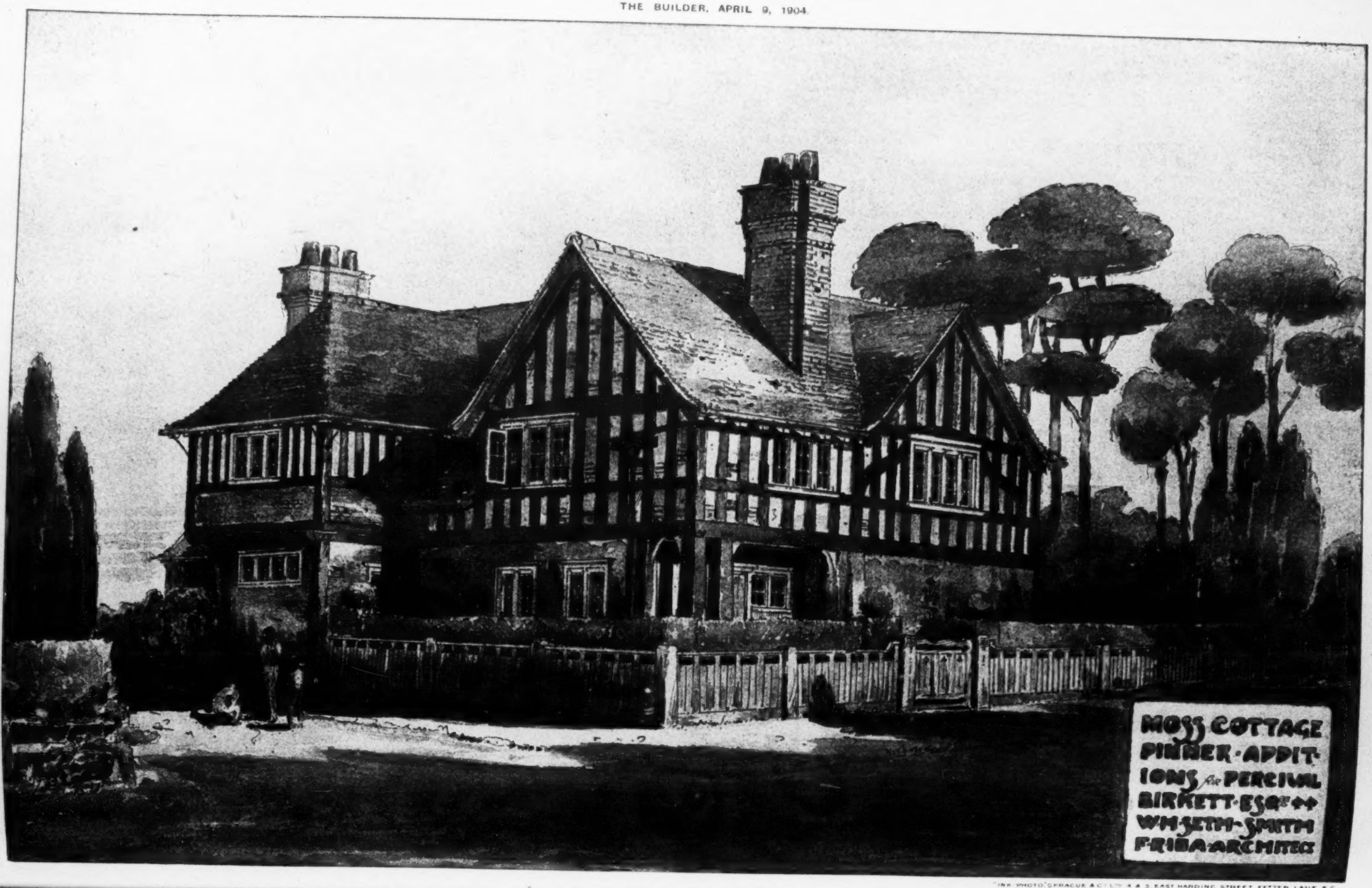
HOUSES, Nos. 32 & 33 HIGH STREET, MARYLEBONE.—Mr W M Brutton, Architect.



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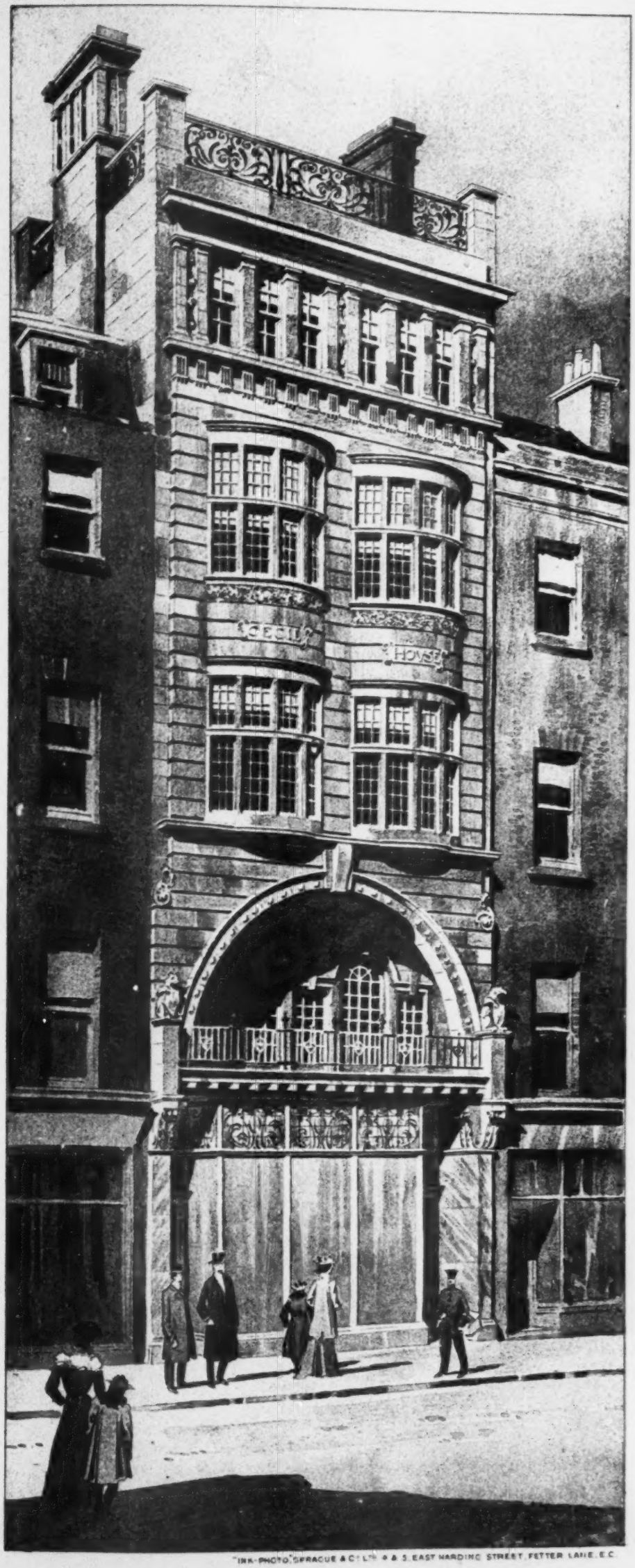

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BUSINESS PREMISES, HIGH HOLBORN.—Mr. A. Sykes, A.R.I.B.A., Architect.

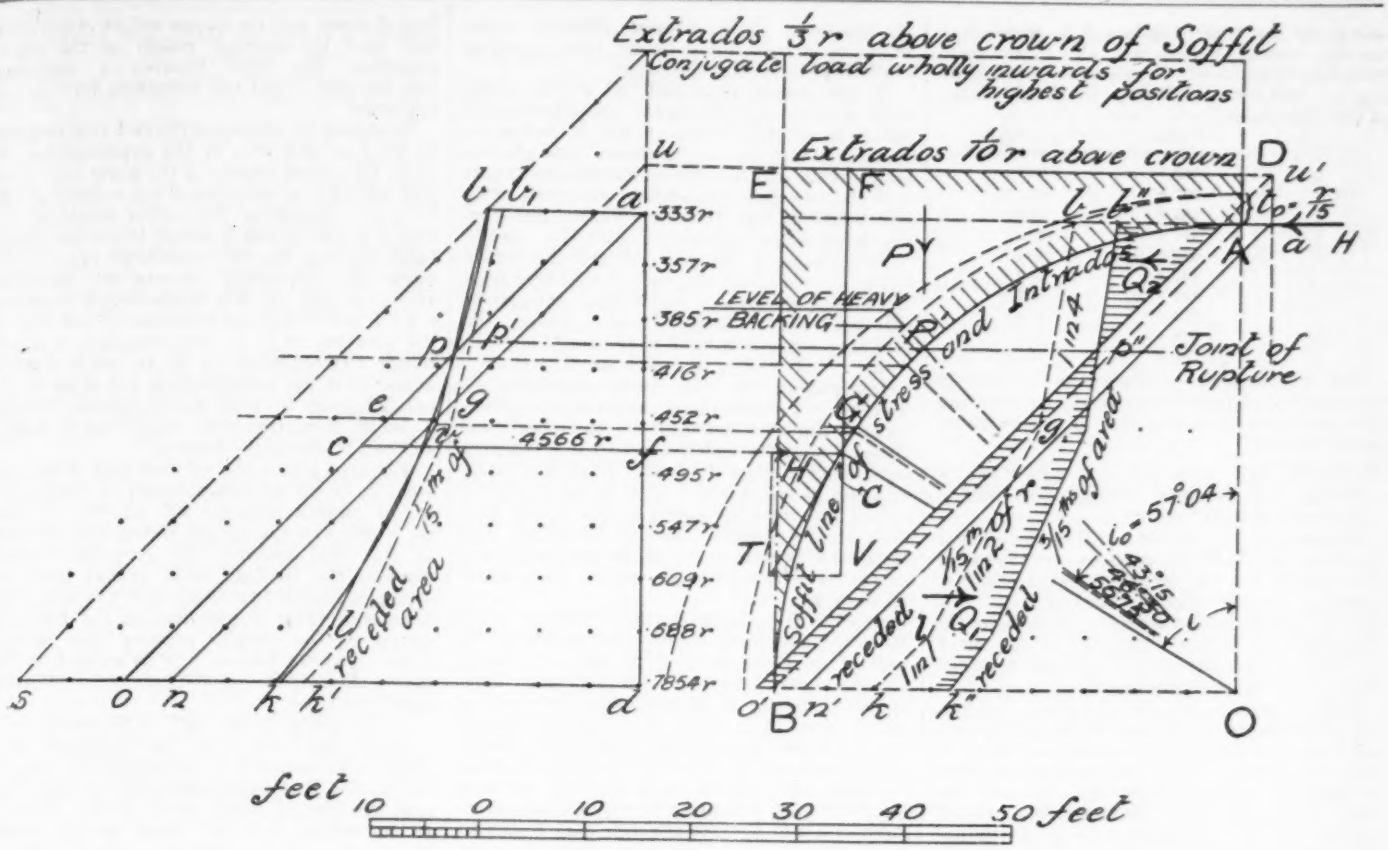


Fig. 61.

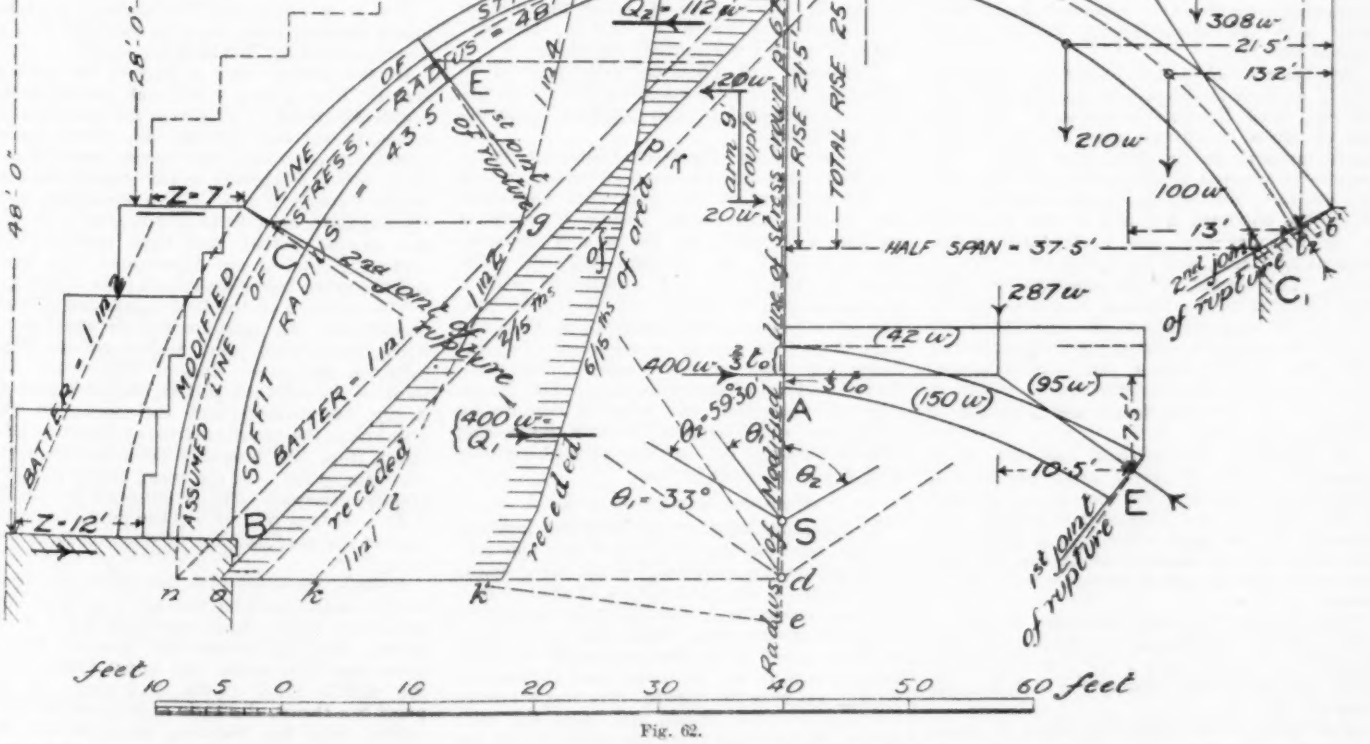


Fig. 62.

The Student's Column.

ARCHES.—XIV.

FOR the further elucidation of Alexander and Thomson's method of dealing with load areas we will now enter a little more fully into details.

Horizontal load area for a semi-circular rib, loaded uniformly along the rib.

Assume the uniform load along the rib, of which A C B, Fig. 61, is the left-hand half, to consist of a ring of unit density with a uniform thickness of half a radius $= \frac{1}{2} r$, so that the area of the part of the ring forming the load of any arc A C shall be equal to the area O A C.

By Navier's principle* the general expression for thrust at the crown is $T = p r$. In this case, adopting the symbol H_0, as in Fig. 61, to indicate crown thrust, and $\frac{1}{2} r$ to represent $q = p$, the unit intensity of uniform pressure, and r the radius, we have

$$H_0 = \tfrac{1}{2} r \times r = \tfrac{1}{2} r^2.$$

This must be the area of the total horizontal load area $a\ b\ k\ d$, standing upon the base $a\ d$, the length of which is equal to r.

If the rib were balanced under the uniform load along the curve alone its form would be a catenary. Assuming the rib to have been intentionally pulled into a semi-circle, as in Fig. 61, the horizontal load to prevent lateral spreading must press inwards at each level, the intensity of the pressure diminishing from the springing to the crown. The breadth $f\ v$ of the horizontal load area at the level of any point C on the rib may be found by the following formula, wherein i = the slope of the curve at C:—

$$f\ v = q = \frac{2\,i - \sin 2\,i}{3 \sin i - \sin 3\,i}\, r.$$

The breadths of the horizontal load area at ten equidistant points of $a\ d$ are found by substituting in the expression for $f\ v$ ten values of the angle i, whose cosines are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 ninths of r, the radius, respectively.

These ten values are given in the second column of the following table, and indicate

* Article XII., p. 316.

points on the true boundary *b k*, which is a regular curve. Values for an approximate boundary formed of the three battered lines *b g*, *g l*, and *l k*, are given in the third column of the same table.

Cos i.	*Values for Curve.*	*Values for Treble Batter Line.*
0	·333 *r*	·333 *r*
⅛	·357 *r*	·361 *r*
¼	·385 *r*	·388 *r*
⅜	·416 *r*	·416 *r*
½	·452 *r*	·444 *r*
⅝	·495 *r*	·500 *r*
¾	·547 *r*	·555 *r*
⅞	·609 *r*	·611 *r*
1	·688 *r*	·666 *r*
1	·785 *r*	·777 *r*

The approximate boundary is sufficiently accurate for all practical purposes, and encloses the exact area $\frac{1}{2} r^2$, required by the equation stated above.

Horizontal load area for a semi-circular rib loaded with the area between itself and a horizontal straight line over it.

Referring to Fig. 61, let A C B be the circular quadrant and D E the extrados or horizontal line over it. In the first place assume that, in addition to the shaded vertical load area D E B A, there is also a uniform load along the rib of intensity $= \frac{1}{2} r$. Then the 45 deg. slope *u o* gives the horizontal load area drawn on the base *a d* for the combined loads.

Now remove, in Fig. 61, the load along the rib, and at the same time remove the corresponding horizontal load area *a b g l k d*, drawn on the same base *a d* and supposed to gravitate horizontally outwards from the rib, while the first area gravitates horizontally inwards towards the rib. Hence, for the given vertical load area between the rib and the straight extrados, the horizontal load area lies between the line *u o* and the curve approximately represented by the treble batter *b g l k*. This area is somewhat like an angular figure eight, and the two boundaries cross at a point *p*. The part below *p* gravitating horizontally inwards is *positive*, and the part above *p* gravitating horizontally outwards is *negative*. Each part must have the same density as the given vertical load area.

Allowance for the excess weight of a masonry ring of uniform thickness.—In dealing with the masonry arch Rankine recommends that the line of stress should be assumed, as a first approximation, to be along the soffit. This practice is followed by Alexander and Thomson in a diagram, from which Fig. 61 is reproduced. Hence the quadrant A C B is at once the soffit of the masonry ring, the "intrados" of the vertical load area, and the linear rib or line of stress. The weight of the masonry ring has been included in the vertical load area as if it were of the same density as the superstructure. The actual density is generally $\frac{3}{4} w$, as compared with the density w of the superstructure. The thickness of the masonry ring is taken at $\frac{1}{15} r$, see $t_0 = \frac{r}{15}$ in the figure, and assumed to act along the soffit.

An additional vertical load has now to be considered uniformly spread along the rib and denoted by two concentric arcs $\frac{1}{15} r$ apart, and of the density $\frac{1}{4} w$. This load is exactly one-fifteenth of the load which, as a matter of convenience, was assumed along the rib, and the subtraction of which introduced the treble batter *b g l k*.

Consequently, it is only necessary to restore a fifteenth part of the area *a b g l k d* by pricking back $b\,b' = \frac{1}{15} b\,a$ and $k\,k' = \frac{1}{15} k\,d$, and similarly at *g* and *l*, and drawing the dotted treble batter *b' k'*.

Practically, then, with the line of stress assumed to be along the soffit, the allowance for a uniform masonry ring with an excess density of 50 per cent. and a thickness of one-fifteenth of the radius is made by receding the treble-batter boundary one-fifteenth.

Allowance for the excess weight of a masonry ring of varying thickness.—As the skewbacks of the segmental circular arch are usually 1·5 times the thickness of the keystone, the masonry ring may be taken to be included between two slightly eccentric circular arcs with their centres on one vertical line and their crowns at the distance t_0 apart and a pair of points, 60 deg. out from the crown, at the distance $2\,t_0$ apart. Two such arcs are indicated in Fig. 61 by the soffit and the upper dotted quadrant. The lower dotted arc is concentric with the soffit, and the excess weight of the part between these two arcs has already been considered. The two dotted circles touch at the crown A, and if completed their greatest distance apart would be at their lowest points, there equalling the difference of their diameters.

At the points right and left of the centre their distance apart is nearly the difference of the radii, slightly more or less according as the horizontal line is measured through one or the other centre. Hence the distance apart *z* of the two dotted quadrants measured along the radius through O, at any angle *i* out from the crown is approximately $z = 2\,t_0\,(1 - \cos.\ i)$.

An element of the area between the dotted circles is $z\,r\,d\,i$, and the vertical load area from the crown out to *i* is the definite integral of this between the limits O and *i*, whence the following expression for P is deduced*:—

$$P = 2\,t_0\,[r\,i - r \sin i].$$

Interpreting the two terms separately:—The first is a uniform load along the arc equivalent to the area between the two concentric circles $2\,t_0$ apart, and the second is a negative load uniform along the span. That is a parallelogram of the height $2\,t_0$ to be taken off the span. But since the excess weight is only $\frac{1}{4} w$, each of the uniform loads is to be an area of uniform breadth t_0 and of the normal density w, one added along the rib and the other taken off the span.

In Fig. 61, assume the load only to reach up to the horizontal through the crown A, the pair of parallelograms A E and *a o* being simultaneously removed. The conjugate horizontal load area is drawn inside the arch in dotted lines, one boundary being the dotted line A *g* B and the other the dotted treble-batter boundary *b g l k*. This last is to be receded three-fifteenths of the area *b* O by pricking back $b\,b' = \frac{3}{15} b$ A, and $k\,k' = \frac{3}{15} k$ O, and similarly at *g* and *l*. One-fifteenth part is due to the uniform part of the ring and the other two-fifteenths to the first term of the spread-out part. At the same time the boundary A B is to be receded one-fifteenth of a radius into the position *a' n'* due to the second term. Finally *a' o'* is to be added when A E is restored.

The conjugate horizontal load area as modified for the thickening-out ring is shown shaded in Fig. 61, the portion Q′ being the portion of it pushing in below p'', and Q_2 the part above p'' pulling horizontally outwards.

Alexander and Thomson next proceed to define and to discuss Rankine's point of rupture, which is indicated by the graphical construction in Fig. 61.

The point p' or p'' projected horizontally on the circle gives P′ the point of rupture, which is the point where the conjugate horizontal load area changes sign. Below P′ there is required a thrust Q_1 on the back of the arch, and above P′ an outward pull Q_2. The angle of rupture A O P′, measured with a protractor, will be found to be 43 deg. 15 min. The joint between two voussoirs at P′ is the joint of rupture, and the point where this joint meets the back of the masonry ring gives Rankine's level of heavy backing. The discussion of the point and joint of rupture by Alexander and Thomson is both interesting and instructive, but for our present purpose need not be followed further.

Semi-circular masonry arch.

In the application of the foregoing methods to the semi-circular arch, of which the left-hand quadrant is shown in Fig. 62, the assumed line of stress is the quadrant *a n*, of 48 ft. radius, with the centre at *d*, and taken up the middle of the masonry ring, which has a thickness A D $= t_0 = 3$ ft. at the crown and a thickness $t_2 = 6$ ft. at the joint near C which is 60 deg. out from the crown. The ring is formed by two eccentric circles, one being the soffit A E C B, described from the centre S with the radius S A = 43·5 ft., and the other described from the centre *e* with the radius *e* D = 52·5 ft. Beyond the joint C the back of the ring is stepped to receive the heavy backing, a portion of which virtually forms part of the arch ring.

From *a* at the middle of the keystone the line *a b* is laid off equal to one-third of 48 ft., the mean radius; then *b g* is drawn with the batter of 1 in 4, so that *g* is at a level four-ninths of 48 ft. lower than *b*; then *g l* is drawn with the batter of 1 in 2, so that *l* is four-ninths of 48 ft. lower than *g*, and *l k* is drawn with the batter of 1 in 1; while *a g n* is drawn through *a*, the crown of the assumed line of stress with the batter of 1 in 1.

These dotted lines include the conjugate horizontal load area, neglecting the weight of the half of the arch ring below the assumed line of stress, and the excess weight of the other half over the average weight of the superstructure. The load between a horizontal line through *a* and the formation level is also neglected.

Assuming the density of the arch ring masonry to be $\frac{3}{4} w$, and that of the superstructure to be w, the excess density of the lower half of the ring will be $\frac{1}{8} w$, and that of the upper half will be $\frac{1}{8} w$. Conjointly the excess weight of the ring is w, and, as this is double the excess weight taken for Fig. 61, the boundaries must recede twice the previously ascertained distances. Hence in Fig. 62 the treble-batter boundary *b g l k* will recede six-fifteenths of the area to the position of *b' k'*, the boundary *a n* will recede two-fifteenths of 48 ft. when there is added to it the parallelogram *u o* equal to the parallelogram between the horizontal through *a* and the formation level, which is at the height *a* O = 3 ft. above the point *a*.

The area *p k' o*, the positive part of the load area, is found by measurement or calculation to be almost exactly 400 sq. ft., so that $Q_1 = 400\,w$ is the inward thrust to be resisted by the solid backing. To give the required reaction the backing must extend from the springing joint B to a distance of z = 12 ft., this dimension being determined in the following manner:—The weight pressing the backing down upon its base is $z \times 48\,w$, and, taking the co-efficient of friction of masonry on masonry at 0·7, we have

$$z = 400\,w \div 48 \times 0{\cdot}7 = 12, \text{ nearly.}$$

Above the level of *p*, the conjugate horizontal load required to act outwardly is $Q_2 = 112\,w$, and if it were practicable to apply this load the line of stress would be the circle of 48 ft. radius, and the thrust at the crown $H_0 = (Q_1 - Q_2) = (400\,w - 112\,w) = 288\,w$.

Rankine recommends* that the heavy backing should be continued up to a level nearly corresponding with *p* in Fig. 61, but in the present case it is only necessary to bring the backing up to the level of *g*, as the thickening of the ring is sufficient backing down to that point.

For a masonry ring of uniform thickness heavy backing may come to the level of *p* as recommended by Rankine.

In the present case a part of the positive area Q_1 from *p* to *g* is left out, as well as the negative part Q_2. This positive part, shaded across, is not entirely left out, being applied lower down, so that the whole inward thrust $Q_1 = 400\,w$ is applied to the back of the arch between joints B and C. An equal portion of the negative area from *p* upwards $= 20\,w$ is also shaded across, and thus two joints of rupture E and C are determined, one above and the other below Rankine's joint of rupture.

The omission of the horizontal load above C necessitates the modification of the line of stress from that joint to the corresponding joint on the other side of the crown. For want of the outward pull Q_2 the arch tends to shrink horizontally and the crown to rise. This brings the centre of stress at the crown joint down from the bisecting point to the lower trisecting point. As the crown thrust H_0 is now greatly increased, $400\,w$ must be divided by A D + D O or $6\,w$, giving the radius of curvature of the modified line of stress at its crown, $\rho_0 = 67$ ft.

A circle described with this radius, having its centre on the vertical through the crown, and beginning at the lower trisecting point of the crown joint A, crosses the assumed line of stress and approaches the upper boundary of the middle third of the arch ring. At the point E a thrust of a little more than $400\,w$ has shifted from the bisecting point to near the upper trisecting point of the joint, a distance of nearly 6 in. This is the same as applying at E¹ the upper end of the block C E, a left-handed couple of $400\,w + \frac{1}{2} = 200\,w$, taking the place of the couple $20\,w \times 9$ ft. constituted by the shaded parts of the horizontal load area above and below *p* which was left out so far as the block C E was concerned.

Three points on the left half of the modified line of stress (Fig. 62) are the lower trisecting point of the crown joint A, the upper trisecting point of the first joint of rupture E, and a point slightly above the middle of the second joint of rupture C.

The verification is as follows. Consider the part A C to be rigid, and see whether the three forces acting upon it meet at a point:—(1) The weight of the structure from C to O =

* "Elementary Applied Mechanics," p. 496.

* "Civil Engineering," p. 424.

680 w, acting downwards through the centre of gravity; (2) the horizontal force H_0 = 400 w acting horizontally through the lower trisecting point of the crown joint; and (3) the oblique thrust near the middle of the joint C. Taking moments about the last point, we have 680 w × 13 ft. and 400 w × 22 ft. approximately equal. It is then only necessary to show that the whole weight from A down to C = 680 w, and the centre of gravity 15·4 ft., measured horizontally from the right-hand vertical boundary. The weights and leverages of four parts into which the area O A C can be divided are figured on the right half of Fig. 62.

Again consider the structure rigid from A to E, when the three forces must again meet at a point:—(1) The vertical force = 287 w through the centre of gravity; (2) the horizontal force = 400 w through the lower trisecting point of the joint A; and (3) an oblique force parallel to the tangent of the line of stress acting through the upper trisecting point of E. Taking moment about this last point, we have 400 w × 7·5 ft. approximately equal to 287 w × 10·5 ft. The areas and levers of the various regular forces into which the area under consideration can be divided are printed on the lower part of the right half of Fig. 62.

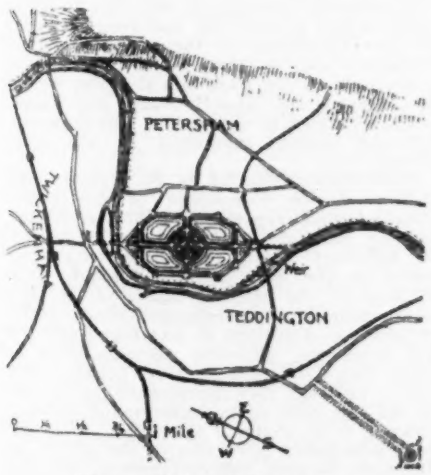
In this way a segmental arch is indirectly designed, the half span of the soffit being 37·5 ft., the rise of the soffit 21·5 ft., the formation level being 4·5 ft. above the crown of the soffit, and the total rise of the formation above the springing level is 26 ft. Five points on the line of stress are known—viz., A, E, and C—and two points on the right half of the arch corresponding with the points E and C on the left half.

Light elastic rubble spandrels to a stretch of 7 ft. are shown above the heavy backing, but these are intended merely to exert horizontal reaction when the live load comes on the opposite side of the arch. Their horizontal resistance is 7 × 23 w × 0·7 = 113 w.

Correspondence.

PROPOSAL FOR A RESERVOIR ON THE THAMES.

SIR,—I send you a rough plan of a suggestion for a reservoir, to hold from 400 to 500 million gallons of water, on a site formed by a bend of the river between Teddington and Twickenham.



Plan of Proposed Reservoir.

The scheme also includes new roads and bridges opening up a district which might be used for building.

A great quantity of material would have to be removed, but might be disposed of profitably, and the work, extended over several years, might help the solution of the "unemployed" question in the locality of London.

J. K.

BOOKS RECEIVED.

GREAT MASTERS. Part XII. (W. Heinemann. 5s.)

THE TECHNOLOGICAL AND SCIENTIFIC DICTIONARY. Part I. (Geo. Newnes. 1s.)

BUILDERS' QUANTITIES. By Herbert C. Grubb. (Methuen and Co. 4s. 6d.)

OBITUARY.

MR. JOHN PETHICK.—On Tuesday, March 29, Mr. J. Pethick succumbed to the injuries sustained in a serious carriage accident on the previous Saturday. Essentially the architect of his own fortunes, Mr. Pethick carved out for himself a career which remains a monument to his business aptitude, enterprise, and energy. Mr. Pethick was born in July, 1827, his father being the manager of the Dartmoor Granite Works, now owned by the firm of Pethick Bros., the well-known contractors. Leaving school at the age of twelve, he was apprenticed to a carpenter, at Turnchapel, and early achieved the reputation of being one of the most skilled craftsmen in the district. When twenty-five years of age he entered into partnership with Mr. Benjamin Call as a builder and contractor. The partnership lasted nearly twenty years, and during that time the firm carried out many important works, among which may be mentioned the railway stations at St. Thomas, Exeter, Newton, Kingswear, and the Duke of Cornwall Hotel and Chubb's Hotel, at Plymouth. In 1871 the partnership was dissolved, and one of the first of Mr. Pethick's large contracts after the dissolution was the erection of new Guildhall and Municipal Buildings at Plymouth, which were opened by the King and Queen, then the Prince and Princess of Wales, in 1874. As a Government contractor, Mr. Pethick carried out many important works in the West of England, including the construction of No. 3 dock at Devonport Dockyard, and the Royal Naval College, at Keyham. He was largely responsible for the extension of the residential area of Plymouth, and for the clearance of some of its slums. He also erected the Grand Hotel on the Hoe, and the first block of workmen's dwellings, known as Bate's Buildings, at Plymouth, and Kelly College, at Tavistock. With Mr. Relf, he constructed the line from Lydford to Friary, 22 miles in length, which gave the London and South-Western Railway for the first time an independent route to Plymouth. This line was opened in 1886, and cost nearly 800,000*l*. Besides numerous cuttings, it comprises two long tunnels and a number of viaducts, of which a noteworthy example is one spanning the river Tavy. In conjunction with his sons he constructed the Vale of Glamorgan Railway from Barry to Bridge End, a distance of some 22 miles. In the Yeo Valley, he built the Bristol Corporation reservoir, and among other works were the construction of the Vale of Rheidol Light Railway from Aberystwith to Devil's Bridge, the reconstruction in granite of many of the viaducts for the Great Western Railway on their Cornish lines, and the erection of a number of country mansions in the western counties. Mr. Pethick was the builder of numerous churches, and many public buildings. Since 1874 Mr. Pethick has been connected with the Town Council of Plymouth, and he served in the office of Mayor during the two years, 1898-1899 and 1899-1900. As a member of the Board of Guardians for many years, he took a lively interest in the welfare of the poor, and an active part in movements for the relief of the unemployed. Mr. Pethick materially aided the church extension movement in the Three Towns by gifts of granite for new churches. When Smeaton's lighthouse was taken down from the Eddystone rock, Mr. Pethick provided, at his own cost, the present granite base required for its re-erection, and but for his generosity it is doubtful whether Plymouth would now have been in possession of the Smeaton Tower, which is so familiar a landmark on the Hoe. Mr. Pethick's name is familiar to our readers in connexion with the foundations and piers of the new Vauxhall Bridge and the widening of London Bridge, both of which contracts he lived to see completed.

GENERAL BUILDING NEWS.

WAREHOUSE, GLASGOW.—The Magasin des Tuileries in Sauchiehall-street, Glasgow, was opened on the 21st ult. The buildings were formerly known as the Corporation Galleries, where for half a century the Corporation art treasures were housed. These have now been transferred to Kelvingrove; but part of the old building is still devoted to art, the exhibitions of the Royal Glasgow Institute of the Fine Arts being held there. The remainder is occupied by MM. Treron et Cie., the proprietors of the Magasin des Tuileries. The warehouse has a frontage to Sauchiehall-street of 245 ft. There are in all forty-eight show windows, thirty-five of these being in Sauchiehall-street and the others in Rose-street and Dalhousie-street. One of the chief features of the building is the dome at the corner of Sauchiehall-street and Rose-street. The warehouse is decorated and furnished in the style of the period of Louis XIV. Mr. Burnet was the architect.

BATHS AND LIBRARY, SHEFFIELD.—A block of public buildings, containing baths, and a library and reading-room, has just been completed for the Park Ward, Sheffield. The work has been carried out from the designs of the City Surveyor (Mr. C. F. Wike) and his staff by the Works Construction Department at a total estimated cost of 18,600*l*. The buildings are of brick, with stone facings, and form a rectangular two-storied block, with a main frontage to Duke-street, and other frontages to Samson-street and Coates-street, while the fourth side overlooks open ground, on which there is room for extension up to the building line of a new street. A feature of the building is the high chimney stack (120 ft.) used in connexion with the boiler furnaces for heating the water used in the baths. The swimming bath runs parallel with Samson-street, and is entered from that thoroughfare. It is 75 ft. long and 30 ft. wide, with a bottom sloping from a depth of 3 ft. at the shallow end to 6 ft. at the deep end. Round the two sides and the shallow end of the bath are dressing boxes, about forty in number, and provision has been made for the construction at some future time of a gallery above the dressing boxes. The bath is lined with blue and white bricks. Also on the ground floor there are eight men's slipper baths, and four ladies' slipper baths, office, conveniences, etc., and on the floor above are placed the caretakers' rooms, and another series of eight men's slipper baths. There is a steel and glass roof over the bath. In the basement are the boilers, coal cellars, laundry, mangling-room, driers, etc., in connexion with the baths. A subway extends all round the swimming bath. The library portion of the premises face Duke-street, and is entirely shut off from the baths. The Lending Library, on the ground floor, and entered from Duke-street, is 76 ft. by 25 ft. A space at one end is screened off as an office for the librarian, the body of the room will be occupied by shelving, and at the end of the room nearest the entrance there is a portion, 18 ft. by 19 ft., which the public will use. Over the Lending Library, on the first floor, is a reading-room of corresponding size, 76 ft. by 25 ft., with a wood-block floor. The reading-room is approached by a wide staircase, with stone steps and glazed brick wall. The buildings at night are lighted throughout by electricity, arc lamps being used over the swimming-bath. Besides the Works Construction Department, the following contractors have been engaged on various parts of the work:—Joiner's work, C. Portass; iron and steel work, W. Ward; engineering and heating apparatus, Moorwood, Sons, and Co.; plumbing and glazing, H. Braithwaite and Co.; and slating and plastering, Charles Chadwick.

TOWN HALL EXTENSION, BRADFORD.—At a meeting of the Finance and General Purposes Committee of the Bradford Corporation on the 24th ult. Mr. F. E. P. Edwards, the City Architect, submitted sketch plans for the proposed extension of the Town Hall. The original scheme provided for the addition of a story to the present building, besides an extension on the site of the old Conditioning House, the approximate cost of the scheme being about 100,000*l*. This proposal the Council vetoed, and the architect was instructed to confine his attention to a new building where the Conditioning House formerly stood, with some structural alterations to the present hall. The present scheme proposes to connect the old and new buildings by a corridor, which will be a continuation of the existing main entrance. This entrance is to be considerably enlarged and improved by taking in the present Council Chamber. The new Council Chamber will be in the centre of the extension, and will accommodate 100 members, in addition to seats for officials and the Press, giving an increase of fifteen seats. The new education authority will be transferred to the new portion, whilst the collector's, architect's, and other departments, at present located in different places in the town, will be transferred to the Town Hall, the Tramways Department being the only one to remain outside. The new frontages have been designed in the Gothic style, to harmonise with the present Town Hall, and the new building will have six stories. The plans, it is stated, met with general approval, and will be submitted in due course to the City Council. The estimated cost of the scheme is 70,000*l*.

ISOLATION HOSPITAL, HAMPTON.—The new Isolation Hospital which has been erected by the District Council in the Uxbridge-road, Hampton Hill, near its junction with Burton's-road, was opened on the 19th ult. In 1902 plans for the hospital were prepared by Mr. S. H. Chambers, the Council's surveyor, and these were sanctioned by the Local Government Board, and the tender of Mr. E. Chamberlain, of Addlestone, at 3,400*l*., was accepted.

The buildings are of stock bricks, with dressings of red Leicestershire sand stocks and patent indurated stone. The roofs are boarded, felted, and covered with Westmorland slates. The accommodation is for ten beds, and the several blocks consist of administrative block, ward pavilion, laundry and disinfecting station, and ambulance station and mortuary. All the blocks are over 40 ft. apart, and the land enclosed leaves room for extensions for some time to come. The buildings are electrically lighted by the Twickenham and Teddington Electric Supply Co. Owing to the limited sum at the disposal of the Council and the present size of the hospital, only a small administrative block has been erected, but as the requirements increase this block will be used as an entrance lodge, and a larger block erected for the matron and nurses.

FREE LIBRARY, GOOLE.—The memorial stones of the new free library at Goole were laid on the 28th ult. Mr. H. B. Thorpe is the architect and Mr. J. Walker is the contractor. The new library will cover an area of about 400 square yards, having a frontage of about 50 ft. to the south side of Carlisle-street and a total depth of about 72 ft. The accommodation on the ground floor will consist of a reading-room, an entrance hall leading to the counter of the lending library, a juvenile room, and a reference library and offices. Nearly the whole of the second story will be taken up for a lecture-room. Externally, facing Carlisle-street, the building will be of red brick, with red Ruabon terra-cotta facings.

THE HENRY SUGDEN MEMORIAL HALL, BRIGHOUSE.—The opening took place on the 26 ult. of the new hall built at the Bridge End Congregational Church, Brighouse, in memory of the late Ald. Henry Sugden, J.P. The hall, which will seat 600, has been erected from plans by Messrs. Sharp and Waller, architects, Brighouse, over a series of one-story classrooms, and has a frontage to the main road connecting Brighouse and Rastrick. The total cost has been about 1,800*l*.

RIDLEY HOUSE, BETHNAL GREEN.—The foundation stone of Ridley House, erected in connexion with the Church of St. James-the-Less, Bethnal Green, was laid recently. The new buildings have been built from the designs of Mr. E. Hoole, architect.

BANKING PREMISES, SHEFFIELD.—A new building has been erected at the corner of High-street and Angel-street, Sheffield, for the Sheffield branch of the York City and County Bank. The frontage is 63 ft. long, and the depth of the premises 77 ft. The front of the ground floor is of Aberdeen granite, the portion above being of carved Hopton wood stone. The building is lighted with electricity. The roof is flat, and is of concrete and asphalte. Concrete is also used for most of the flooring and the partitions. On the ground floor there is the large banking hall. The walls and counter fronts are of marble, and there are a number of square marble columns. The clerks' and upper office section entrance is floored with marble mosaic, and behind the counters the floor is of wooden blocks. The window and door fittings on the ground floor are of bronze, and the other fittings of the banking hall are made of Italian walnut and mahogany. At the back of the counters are screens of inlaid Italian walnut. To the left of the large entrance to the banking hall is a fireplace of inlaid marble, near the top being the Sheffield coat of arms. The ground floor also consists of the manager's room and waiting-room, both of which are fitted in Italian walnut. On the same floor also there is a stationery room, with fittings of stained wood. There are two suites of offices on the first floor, a suite of offices on the second floor, and the next floor comprises three suites of offices and caretakers' rooms. In the basement there are two strong-rooms, clerks' rooms, etc., and there is also a sub-basement. The banking premises are heated throughout with hot water. The architect is Mr. Walter Brierley, of Lendal, York; Messrs. Longden and Sons were the contractors, and Mr. A. S. Woodhead has superintended the fitting of the interior.

ALTERATIONS TO THE TOWN HALL, FOLKESTONE.—On Thursday, the 24th ult., an inquiry was held at the town hall into an application by the Town Council for permission to borrow 4,400*l*. for alterations to the town hall buildings, according to plans prepared by Mr. Reginald Pope. The architect, in explaining his plans, said that the floor space of the large hall would be decreased, but the gallery accommodation considerably increased, and there would also be separate exits.

BUSINESS PREMISES, PICCADILLY.—At the corner of Air-street, Piccadilly, new premises have been erected for Messrs. J. C. Cording and Co., Ltd. The architect of the building is Mr. Harold A. Woodington; and Messrs. Howard and Co., of Covent Garden, have been the builders.

SANITARY AND ENGINEERING NEWS.

GAINSBOROUGH WATER UNDERTAKING.—On the 23rd ult. was celebrated the completion of a scheme of water supply which has occupied the attention of the Gainsborough Urban Authority for twenty years. The boring, which is the largest sunk for waterworks purposes in the kingdom, if not in the world, naturally involved difficulties and delays of no ordinary kind; in fact, owing to the breaking of the boring rope and the burying of the boring tool at a depth of 725 ft. from the surface, this work was practically at a standstill for twenty months. However, through patience and perseverance on the part of the contractors (Messrs. E. Timmins and Sons, Ltd., of Runcorn), the boring tool was at last recovered, and the boring completed to a total depth of 1,515 ft. in 1900. Mr. Jabez Church having died in 1896, the District Council appointed his partner and successor (Mr. Percy Griffith, M.Inst.C.E., F.G.S.) as engineer to the scheme, and to him fell the duty of dealing with the pumping machinery required. The capacity of the pump was fixed between a maximum of 60,000 gallons per hour and a minimum of 40,000, and a double-acting "concertina" pump, with Ashley's multiple valves, was specified. Contractors were invited to submit their own designs for the engine, and that of Messrs. Combe, Barbour, and Combe, of Belfast, was accepted. On starting the pumps it was ascertained that the minimum yield could not be obtained, but since that time the actual yield has increased from 29,000 gallons per hour to 32,000 gallons, and there is every reason to believe that as time goes on the fissures in the sandstone will open out, and a still further supply will be secured. The present yield is, however, more than sufficient for the maximum requirements of the town.—*Sheffield Telegraph.*

DRAINAGE WORKS, ASTON.—In the early part of last year the Aston Surveyor (Mr. G. H. Jack) prepared a scheme for the storm-water drainage of the whole of the district at a cost of 56,500*l*. For a long time the local authority has been cognisant of the fact that the main sewers were inadequate to take both storm water and sewage matter, the result being that properties were flooded. So serious were the complaints received that the Highways Committee recognised the desirability of remedying the evil as early as possible. Owing, however, to the other large schemes on hand in the district, the Council has not thought it advisable to proceed with the scheme as a whole. Therefore it was decided to deal with the most urgent parts of the district first, and, in accordance with this, works have already been carried out at Witton. On the 29th ult., Mr. F. H. Tulloch, M. Inst.C.E., inspector of the Local Government Board, conducted an inquiry at the Council House, Aston, into the application of the Council for power to borrow 2,500*l*., for works of drainage at Aston Cross, which is one of the points requiring immediate attention.—*Birmingham Daily Post.*

SEWAGE SCHEME, MORLEY.—At the monthly meeting of the Morley Town Council the Borough Engineer (Mr. W. E. Putman) explained the plans for the completion of the sewage purification works, and a discussion took place on the proposal of the Sewage Purification Committee that the scheme and plans be approved, and that application be made to the Local Government Board for sanction to the borrowing of the sum of 18,000*l*. for carrying out the works. It was ultimately decided to adopt the recommendation of the Committee.—*Yorkshire Daily Observer.*

FOREIGN.

FRANCE.—The Municipal Council of Paris have voted a sum of 41 million francs for the construction of new schools.——A new artesian well in the XIIIth arrondissement of Paris was inaugurated last week.——The President of the Republic opened last week the new Bretonneau Hospital for Children at Montmartre, in Rue Etex and Rue Carpeaux, and also a new fire brigade barracks in Rue Carpeaux, which was described in the *Builder* two years ago, when the members of the Congress of Architects visited it. M. Héneux is the architect of both buildings.——The Lycée Saint-Louis, Paris, is to be enlarged, and at the same time the Rue de Vaugirard prolonged to the Boulevard Saint-Michel. The total cost will be about 1,250,000 francs, to be shared equally between the State and Municipality of Paris.——An asylum for aged men is to be built at Lille, the cost being defrayed by a citizen of the town, M. Wanoschot.——The Chamber of Deputies has under consideration a bill for the enlargement of the town of Lyons, by taking in the suburban communes of Villeurbane, St. Rambert, Ile Barbe, and Calaires.——A sanatorium for consumption, especially intended for French school teachers of both sexes, is to be built at Guéret, on the south-western slope of Puy-de-Gaudy.——The new Hôtel de Ville at Sens was opened last Sunday. It is from the designs of two Parisian architects, M. Dupont and M. Poivert. Its cost has been 945,000 francs.——The "Société Académique d'Architecture" of Lyons has given the following subjects for its annual competition for this year:—In architecture, an Ecole des Beaux-Arts: in archæology, a drawing of an ancient house in the Rue Lainerie; and in decorative art, designs for a stair balustrade and for lamp pendants for a drawing-room.——The Government has given orders for the removal of the crucifixes and other religious emblems placed in the Courts of Justice. In consequence of this order, it is probable that the "Christ," by M. Bonnat, which decorates the Assize-court of the Seine Department, will be sent to the Petit Palais. The celebrated triptych, by Van Eyck, which formerly decorated the old large chamber of the Parliament House, and is at present in the First Chamber of the Civil Court, will probably be sent to the Louvre.——During next session, the Municipal Council of Paris will again be occupied with the question of the Boulevard Haussmann, the prolongation from Rue Taitbout to the Boulevard Montmartre which has been long desired, and which it will cost the city about 15 million francs to carry out.——The restoration of the ancient church of St. Pierre at Montmartre, which has been interrupted, is to be continued, the cost being divided between the State and the Municipality.——The death is announced, at the age of 63, of M. Edouard Boulanger, architect, pupil of the Ecole des Beaux-Arts and of Constant Dufeux. He obtained in competition the commission for the cathedral of Saïgon, and in 1883 he was architect for the French section of the International Exhibition at Amsterdam. He became, about the same time, a member of the Société Centrale des Architectes.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The work of Mr. John W. Simpson, F.R.I.B.A., and of Mr. Maxwell Ayrton, A.R.I.B.A., will in future be carried on in partnership at 3, Verulum-buildings, Gray's Inn, W.C.——Mr. W. E. H. Clarke, architect (Hereford), has removed his offices from 4, Portland-street to Cathedral Chambers, King-street, Hereford.

"RECENT EXCAVATIONS IN THE ROMAN FORUM."—In our review, under the heading "Books" last week, the statement in a quotation from the book, that part of the inscription of Augustus in regard to the altar of Vulcan was "found in 1848," should have been corrected to "1548." The author of the review being on a journey at the time, his corrected proof did not reach us till too late.

MANCHESTER INFIRMARY.—Mr. E. J. Milner Allen writes to say that the accepted design for the rebuilding of the infirmary on the Piccadilly site, at Manchester, referred to in our article of last week was the joint work of Mr. Simpson and himself, though Mr. Simpson alone, as stated in our article, was responsible for the design submitted in the recent competition.

UNDERGROUND ROOMS IN ST. PANCRAS.—The Public Health Committee of the London County Council reported as follows at the meeting last week of the Council:—"We reported on February 2 last that when inquiry was made in the Metropolitan Borough of St. Pancras by the Medical Officer of Health as to the number of underground rooms illegally occupied as dwellings, it was found that over 400 tenements, affording accommodation for more than 1,000 persons, were occupied separately, although they contravened the provision of the law relating to underground rooms beginning to be occupied after 1855. As a result of a subsequent inspection of the district, the Borough Medical Officer reported that there were 640 rooms in which the conditions were practically irremediable, and he suggested that these rooms should be dealt with consecutively and at intervals, 'so as to avoid the serious effects of suddenly displacing a large population.' The first set of notices, dealing with fifty houses, was served by the Borough Council on August 7, 1903, and since that date the Borough Council has decided to serve further notices as follows—on December 15, fifty-eight; on January 13, twenty-seven; and on March 2, ninety; making 225 in all. We understand that it is proposed to serve further notices at intervals so that all the houses which are illegally occupied will be dealt with by the end of the summer of this year. The Council, on December 22, 1903, decided to press the Borough Council to proceed with more rapidity in the matter, and we are glad to observe that substantial progress is now being made. We will report later as to the effect of the notices served by the Borough Council."

NATIONAL REGISTRATION OF PLUMBERS.—The annual meeting of the Leeds District Council for the National Registration of Plumbers was held on Friday last week at the Leeds Institute of Science, Art, and Literature. The annual report, which was presented to the meeting, refers to the number of plumbers added to the register during the past year as being satisfactory, and urges that all plumbers not at present on the register should take steps to become registered while they are able to do so under the present conditions. The following resolution was passed unanimously:—"That this meeting of the Leeds District Council for the National Registration of Plumbers records its emphatic opinion that the time has arrived when the voluntary system of registration for plumbers, carried on in Leeds and other large centres of population in the United Kingdom by the joint action of the public authorities and the plumbers, should be placed on a statutory basis, on lines already approved by the Local Government Board, in the interests of public health and economy, and that such legislation is a necessary adjunct to the powers already exercised by sanitary authorities and the water undertakings of the Kingdom."

GEOLOGICAL EXCURSIONS.—Professor Seeley, King's College, London, will conduct ten geological excursions to examine the main channel of the Thames and some of its tributaries, to begin April 23, at Purfleet, where the Thames flows over the chalk.

SHEFFIELD MASTER BUILDERS' ASSOCIATION.—The annual dinner of the Sheffield Master Builders' Association was held on the 29th ult. at the Building Trades' Exchange, Cross Burgess-street, Mr. J. D. Cook (President) in the chair. The loyal toasts having been honoured, Mr. J. Biggin proposed "The Corporation, City, and Trade of Sheffield." He remarked that in Sheffield at the present time people were discussing the question of house providing. They as builders were of opinion that this should be left to private enterprise, so far as private enterprise could cover it. But in Sheffield there was a class of houses required that private enterprise could not provide. There were thousands of men in Sheffield—labourers and others—whose average wage, taking the year round, did not exceed 1*l.* a week. It was not possible for these to pay more than 4s. a week rent. Houses of this class were not provided by private enterprise, and he thought it was the duty of the Corporation to step in and provide them. Private enterprise, he contended, did enough for everybody else except this class in this direction. They agreed that the water, tramways, electric light, and the markets should be in the hands of the Corporation, but were absolutely unanimous that public work paid for out of public funds should be put up for public competition. If that were done the Works Construction Department might shut up at any moment. It was not possible for any class of men to carry on a Works Construction Department successfully in competition with the open market. Certain parties were doing their utmost to revive this department, but if all the councillors of Sheffield were to unite in an effort to revive the department he thought they would eventually fail.—Councillor Lancashire first responded, and in the course of his remarks he referred to the Water Committee, which, he said, was now a paying concern, and he looked to it to materially reduce the rates. They were just completing one of the largest reservoirs at Langsett, and the work of another was half way through, so that in eighteen months or two years they would have an immense supply, sufficient not only for Sheffield, but also for Rotherham, Doncaster, and the Don Valley. As to the Works Construction Committee, he expressed his continued opposition to it. Alderman Nixon, who also responded, spoke of the need of sound business men on the Corporation. Referring to the housing question, he spoke of the severity of the Local Government Board regulations, compelling the erection of houses commensurate with those destroyed, thus putting up the expense. He also expressed himself opposed to the Works Construction Department as an injustice to those trading in competition with it. The toast of "The House of Commons" was submitted by Councillor Longden, and Alderman Batty Langley, M.P., responded. In reference to the Works Construction question in Sheffield, he thought it possible to form a committee to do repairs, large and small, without conflicting with the honourable competition of builders. He never believed the Sheffield builders had been in collusion with reference to any tender given in regard to large buildings. The Works Construction Committee, he added, was not quite done for, but owing to the withdrawals, it had had a severe shaking. When it rose again it would have to occupy a vastly different position. Mr. H. Hodkin submitted the toast of "The National Association" and "The Yorkshire Federation." Councillor Longden, one of the vice-presidents of the latter federation, in responding, spoke of the usefulness of federation in the prevention of strikes, proving a blessing to both masters and workmen in the building trade. The toast of "The Architects and Surveyors of Sheffield" was also honoured, on the proposition of Mr. A. J. Forsdike, Mr. Thomas Winder responding. Mr. Charles Hadfield gave "The Sheffield Master Builders' Association." The President (Mr. J. D. Cook), in reply, spoke of the better understanding now existing between builders and architects in Sheffield. Their Association, he added, was last year admitted to membership of the Sheffield Chamber of Commerce. This recognition, he contended, ought to have come before, considering the importance and extent of their industry. "Our Guests" was given by Mr. Joseph Coward, the City Surveyor (Mr. C. F. Wike) and Mr. J. J. Bingham responding.

YORKSHIRE COUNTY COMMITTEE AND CLIFFORD'S TOWER.—The quarterly meeting of the Yorkshire County Committee was held at York Castle recently, Mr. C. J. Milnes Gaskell in the chair. The final report from Mr. Micklethwaite, F.S.A., with reference to Clifford's Tower was read, and a draft of rules for the admission of the public were submitted and considered. The military prison at the Castle is close to Clifford's Tower, and for that reason, before the rules are finally adopted they will have to be approved by the Prison Commissioners. It was hoped by the meeting that by July, or perhaps earlier, the public would again be admitted to the tower. The structure, it was stated, is now in a secure condition, and the timber supports and shoring are about to be loosened and removed gradually.

DERBY MASTER BUILDERS' ASSOCIATION.—The annual dinner of the members of the Derby Master Builders' Association was held recently at the County Hotel, Mr. Joseph Dickinson (President) in the chair. The loyal toast having been honoured, Mr. J. V. Porter proposed "The Mayor, Magistrates, and Corporation," the responders being Mr. W. J. Piper and Councillors Eaton and Brown. Mr. W. E. Starkey, in proposing "Success to the Midland Federation and Derby Master Builders' Association," contended that it had done good work, and pointed out that in various ways it might be made more useful. The President, in responding to the toast, claimed that the Federation was an excellent organisation, and that as to the Derby Master Builders' Association all it desired was justice between man and man. Whilst it endeavoured to safeguard the interests of the employers, its members wished to deal fairly and squarely with their men. The building trade was passing through a period of depression, and he asked for the Association an increased measure of support. The Vice-President also acknowledged the toast. Other toasts followed.

RUSSIAN TIMBER TRADE.—Mr. Consul-General Smith, reporting on the trade, etc., of Odessa and district, writes that the timber market was quiet, the only real demand being for French staves, for which 20*l.* 2s. 7d. to 20*l.* 13s. 2d. per 1,000 were quoted at Odessa port at the beginning of the year. The trade in oak wood for building purposes has, during the last two years, declined, especially in the sorts destined for the United Kingdom. This is owing, Mr. Smith considers, to the fact that America has been largely exporting to the United Kingdom, thereby causing heavy losses to local dealers.

CAPITAL AND LABOUR.

JOINERS' WAGES AT BRIGHOUSE.—In accordance with a code of rules and regulations agreed upon some years ago between the employers and employed in the Brighouse joinery trade, the operative carpenters and joiners served their employers with a notice six months ago for an advance in wages of ½d. per hour, totalling to 3s. per week, making the rate of wages in Brighouse the same as in Halifax, Huddersfield, and other surrounding towns. At present the rate paid in Brighouse is 7½d. and 8d. per hour. The new rate should have come into operation on the 1st inst., but owing to the depression in the building trade in the Brighouse district the workmen have decided, it is stated, to withdraw the notice and go on at the old terms.

ABERDEEN JOINERS.—The Aberdeen Masters' Association have intimated to the operatives that they do not propose to make any change in the rate of wages in the course of the year. They suggest, however, certain minor alterations in the by-laws, and these have been remitted to a committee for consideration. It is a stipulation of the by-laws, agreed to by employers and men, that the side desiring any change in the conditions of work must give notice at this period of the year.

THE BUILDING TRADE AT BARROW.—A dispute has arisen between the master builders at Barrow and the men employed in various branches of the building trade. The masters desire all the trades, with the exception of painters, to work shorter hours in winter. At present the winter hours are fourteen weeks at 49 hours, and the men are asked to work 47 hours during November and February, and 41½ during December and January. Further, when allowing "walking" time, that the Central railway station gates shall be considered the centre of the town, instead of the Town Hall as at present. The masters have offered to refer the matter to arbitration, and the plasterers have agreed to this. Other trades, however, are declining to start except on the old terms. It is thought there will be either a strike or a lock-out.—*Sheffield Daily Telegraph.*

Legal.

DECISION UNDER THE LONDON BUILDING ACT, 1894:

ASHBRIDGE *v.* EVANS.

MR. ASHBRIDGE, District Surveyor for St. Marylebone, recently summoned Mr. Evans for having done certain work in, to, or upon a building, consisting of digging trenches under, and in close proximity to, the walls of a house in Queen-street, Edgware-road, for the purpose of re-draining, without first giving him notice under the Act.

Mr. Andrews, from the Solicitors' Department of the London County Council, by direction of the Council, appeared in support of the summons, and, having called the attention of the magistrate, Mr. Curtis Bennett, to certain sections of the Act, explained that the trenches in question had been dug under the rear wall of the house, through the centre of the building under the basement floor and along the side front, the latter trench being in an area and coming within a few inches of the side front and causing the house to at once comence to collapse, no proper shoring having been erected before the commencement of the work.

He further explained that it became necessary for the building to be dealt with promptly as a dangerous structure case, and that at the request of the District Surveyor the house was immediately shored up by the Works Department of the London County Council, and afterwards almost entirely demolished under an order obtained before Mr. Plowden. Thus, by prompt action, what might have been a very serious accident—possibly attended by loss of life—was averted.

The defendant having admitted the facts of the case, and having explained that he did not know that he was required to give notice, the magistrate inflicted the maximum penalty of 40s. with 23s. costs.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

5,221 of 1903.—A. BELL: *Manufacture of Register Grates and the like.*

This relates to the manufacture of register grates and the like. In carrying out the invention a platform is provided with two side wings, and extended at the back with a frame to carry a grating. The platform is made in various widths corresponding to the size or width of the fire, and the frame at the back is also made to correspond to the inside size of the firebrick back of the grating. The two wings at the sides of the platform are provided with hooks or other means of attaching the platform to the front of the grate, and the invention when in use will form the bottom grating or stand upon which the fire is placed with an extended front.

6,251 of 1903.—I. JONES: *Locks and Latches, Fitted with End-way Moving Bolts.*

A lock or latch case having a movable bolt, which is engaged in being drawn in. The case is provided with guides to prevent the bolt from falling inside the case owing to wear or other cause.

7,710 of 1903.—J. FORDHAM and A. S. CLARKE: *Chimney and Ventilating Shaft Tops, applicable also to Stoves for Preventing Down Draught.*

A top or device for chimney and ventilating shafts, comprising a vertically-arranged tube adapted to be attached to the top or bottom of the chimney or shaft, a truncated cone forming an extension of said tube, a fan so mounted above said cone as to be capable of

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

rotation in a plane at right angles to the axis of the cone, a skirt in the form of an open tube surrounding the truncated cone at a convenient distance therefrom, and a hood carried above the said fan.

8,177 of 1903.—H. L. DOULTON and R. J. PLEACE: *Fittings for Water-closets and the like.*

In cisterns for flushing closets and the like, the adoption of a syphonic arrangement having two outlet legs, one leg being connected to the closet inlet and the second leg being utilised, when the water descends, for withdrawing air by suction from the outlet of the closet.

8,233 of 1903.—J. WALKER: *Appliances for attaching to Domestic and other Fireplaces for Increasing the Draught.*

In a draught-inducing device of the character described in the specification of the prior Letters Patent No. 13,434 of 1884, the combination with the main body or plate formed with a semi-spherical depression therein of a series of holes passing through the plate below the depression and outstanding flanges at either side of the series of holes.

8,345 of 1903.—J. DYKES, A. DYKES, and A. DYKES: *Fluid Pressure Cranes or Lifts.*

An improvement in cranes or lifts actuated by fluid pressure, the said improvement consisting of the whole combination of two cylinders and two rams and a system of distributing valves, one of the said cylinders and rams fitted with a high multiplying gear, and the other said cylinder and ram with a single gear, and accompanied, if necessary, by one or more lead pulleys, the said cylinders and rams actuated by fluid pressure, such pressure passing through the said distributing valves of such construction as to allow either ram or cylinder to be uplifted independently of the other substantially by manipulating the said distributing valves.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

March 18.—By DAVID ROBERTS & SON (at Corwen).

Corwen, Merioneth.—Fronhyfryd, four freehold houses, including rights of way	£790
Mount-st., seven freehold houses	165
Hill-st., "Penbryn Cottage" and six other cottages, f.	465
London-rd., three freehold houses and shop	635
Brook-st, three houses and seven cottages, f.	465
Aber-view, two cottages, workshop, mission room, yard, etc., f.	360
Rose-pl., five houses, also gdns, etc., f.	385
Cynwyd, Merioneth.—Eight houses and shop (post office), f.	340

March 22.—By W. H. SHINER & WINTER (at Yatton).

Nailsea, Somerset.—"Bartlett's Farm." 23 a. 0 r. 9 p., f.	1,450
"Foster's Farm," 20 a. 0 r. 17 p., f.	1,225
Various enclosures of land, 24 a. 1 r. 2 p., f.	875
Kenn, Somerset.—"Decoy Farm," 86 a. 2 r. 27 p., f.	1,600

March 26.—By DAVID ROBERTS & SON (at Bala).

Trawsfynydd, Merioneth.—"Glanllafar Farm," 211 a. 3 r. 28 p., f., y.r. 55*l.*	1,250
"Nantbudr" "Nantliliwgys" and "Caerhingylliad" Farms, 404 a. 2 r. 21 p., f., y.r. 110*l.*	2,600

March 28.—By BRODIE, TIMBS, & Co.

Totteridge, Herts.—"Loxwood" and 1 acre, u.t. 94 yrs., g.r. 30*l.*, p.	2,000

By ELLIOTT, SON, & BOYTON.

Regent-street.—Nos. 153 and 155 (s.), u.t. 15½ and 16½ yrs., g.r. 27*l.* 5s. 1d., y.r. 627*l.* 5s. 1d.	6,375

By WM. HOLLIS.

Hendon.—Finchley-la., "Ivy Villa," f., e.r. 65*l.*	890

By J. & S. MOTION.

Bow.—131, Bridge-st. (s.), f., y.r. 35*l.*	500

By C. SPARROW & SON (at Finchley).

Mill Hill.—Main-rd., a Freehold Building Estate, area 7½ acres	3,100
Finchley.—24, 26, and 28, Lodge-la., u.t. 73 yrs., g.r. 12*l.*, w.r. 66*l.* 6s.	425
4, Long-la. (s.), f, y.r. 50*l.*	740

By C. RAWLEY CROSS & Co. (at Kew Bridge).

Ealing.—41, Chandos-av., u.t. 98 yrs., g.r. 4*l.* 10s., w.r. 32*l.* 10s.	235
Chandos-av., etc., f.g. rents 35*l.* 10s., reversion in 98 yrs.	800

By OLIVER & APPLETON (at Darlington).

Great Aycliffe, Durham.—19 Closes of Land, u.t. 981 yrs., g.r., etc., 84*l.* 10s., y.r. 155*l.*	1,130

By R. C. S. EVENETT (at Greatham).

Bordon, Hants.—Kingsley Brick Works, area 13 acres, f., p.	1,600

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops; ct. for court.

MEETINGS.

FRIDAY, APRIL 8.

Junior Institution of Engineers (Westminster Palace Hotel).—Paper on "The Heating and Ventilation of Factories," by Mr. Kenneth Gray. 8 p.m.

Glasgow Architectural Craftsmen's Society.—Business Meeting. 8 p.m.

SATURDAY, APRIL 9.

Incorporated British Institute of Certified Carpenters.—Monthly Meeting. Mr. H. Eustice on "Timbering in Mines," illustrated by lantern slides. 6 p.m.

Northern Architectural Association.—Excursion Meeting. Members to assemble at the Infirmary, the Leazes, Newcastle, at 3 p.m.

MONDAY, APRIL 11.

Society of Engineers.—Mr. H. C. H. Shenton on "The Latest Practice in Sewage Disposal." 7.30 p.m.

Institute of Sanitary Engineers, Ltd.—(1) Examination and Literary Committee. 4 p.m. (2) Organising Committee. 6 p.m. (3) By-laws Committee. 7 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—7 p.m.

Liverpool Architectural Society.—Annual General Meeting: Election of Council and Officers. 6 p.m.

Bristol Society of Architects.—Annual General Meeting. Election of Council and Officers. 8 p.m.

TUESDAY, APRIL 12.

Institution of Civil Engineers.—Mr. E. W. de Rusett on "Recent Developments in Cargo and Intermediate Steamers." 8 p.m.

WEDNESDAY, APRIL 13.

Architectural Association (Discussion Section).—Paper by Mr. W. E. Davis, entitled "A Retrospect, Vol. I. of *The Builder.*"

Sanitary Institute (Lectures for Sanitary Officers).—7 p.m. (Visit to East London Soap Works, Bow. 3 p.m.)

Institution of Civil Engineers.—Students' Visit to the Works of the Great Northern, Piccadilly, and Brompton Railway, in course of construction. 2.30 p.m. Assemble at the Brompton-road Station site, adjoining the Oratory.

Institute of Sanitary Engineers, Ltd.—(1) General Purposes and Finance Committee. 4 p.m. (2) Election Committee. 5.15. (3) Sessional Meeting, when a discussion will be opened by Mr. A. A. H. Scott on "Combined Drainage." 7 p.m.

THURSDAY, APRIL 14.

Royal Institution.—Professor Dewar, M.A., on "Dissociation," I. 5 p.m.

Institution of Electrical Engineers.—(1) Continuation of Discussion on paper on "Direct-Reading Measuring Instruments for Switchboard Use," by Messrs. K. Edgcumbe and F. Punga. (2) Mr. M. B. Field on "Eddy Currents and Eddy Current Losses in Cable Sheaths." 8 p.m.

FRIDAY, APRIL 15.

Institution of Mechanical Engineers.—Paper to be further discussed: "Compound Locomotives in France," by M. Edouard Sauvage, Chief Consulting Engineer, Western Railway of France. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—7 p.m.

TO CORRESPONDENTS.

S. S. P.—(Below our limit).—W. A. C.—(Amount should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER and *not* to the Editor.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and Quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	16	0	per 1000	alongside, in river.	
Rough Stocks and Grizzles	1	13	0	,,	,,	,,
Facing Stocks	2	12	0	,,	,,	,,
Shippers	2	10	0	,,	,,	,,
Flettons	1	10	0	,,	at railway depôt.	
Red Wire Cuts	1	13	0	,,	,,	,,
Best Fareham Red	3	12	0	,,	,,	,,
Best Red Pressed Ruabon Facing	5	0	0	,,	,,	,,

BRICKS, &c.—(*continued*).

	£	s.	d.			
Best Blue Pressed Staffordshire	4	4	0	per 1000	at railway depot.	
Do. Bullnose	4	10	0	,,	,,	,,
Best Stourbridge Fire Bricks	4	8	0	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	13	0	0			
Headers	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	17	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamferred, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamferred, Squints	14	0	0	,,	,,	,,
Second Quality, White and Dipped Salt Glazed	2	0	0	,,	less than best.	

	s.	d.		
Thames and Pit Sand	7	3	per yard,	delivered.
Thames Ballast	6	0	,,	,,
Best Portland Cement	30	0	per ton,	,,
Best Ground Blue Lias Lime	21	0	,,	,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s.	d.		
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.	
Do. do. delivered on road waggons, Nine Elms Depôt	1	8¼	,,	,,
PORTLAND STONE (20 ft. average)—				
Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	1	,,	,,
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	2½	,,	,,

	s.	d.		
Ancaster in blocks	1	11	per ft. cube,	deld. rly. depôt.
Beer ,,	1	6	,,	,,
Greenshill ,,	1	10	,,	,,
Darley Dale in blocks	2	4	,,	,,
Red Corsehill ,,	2	5	,,	,,
CloseburnRedFreestone	2	0	,,	,,
Red Mansfield ,,	2	4	,,	,,

YORK STONE—*Robin Hood Quality*

	s.	d.		
Scappled random blocks	2	10	per ft. cube,	deld. rly. depôt.
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per foot super.	,,
6 in. rubbed two sides ditto, ditto	2	6	,,	,,
3 in. sawn two sides slabs (random sizes)	0	11½	,,	,,
2 to 2½ in. sawn one side slabs (random sizes)	0	7½	,,	,,
1½ in. to 2 in. ditto, ditto	0	6	,,	,,
HARD YORK—				
Scappled random blocks	3	0	per ft. cube	,,
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2	8	per ft. super.	,,
6 in. rubbed two sides Ditto	3	0	,,	,,
3 in. sawn two sides (slabs random sizes)	1	2	,,	,,
2 in. self-faced random flags	0	5	,,	,,

Hopton Wood (Hard Bed)	in blocks	2	3	per ft. cube.	
,, ,, ,,	6 in. sawn both sides	landings	2	7 per ft. super.	deld. rly. depôt
,, ,, ,,	3 in.	do.	1	2½ ,,	deld. rly. depôt ,,

SLATES.

in.	in.	£	s.	d.		
20 × 10	best blue Bangor	13	2	6	per 1000 of 1200	at r. d.
20 × 12	,, ,,	13	17	6	,,	,,
20 × 10	best seconds ,,	12	15	0	,,	,,
20 × 12	,, ,, ,,	13	10	0	,,	,,
16 × 8	,, ,, ,,	7	0	0	,,	,,
20 × 10	best blue Portmadoc	12	12	6	,,	,,
16 × 8	best blue Portmadoc	6	12	6	,,	,,
20 × 10	best Eureka unfading green	15	2	6	,,	,,
20 × 12	,, ,,	17	2	6	,,	,,
18 × 10	,, ,,	12	10	0	,,	,,
16 × 8	,, ,,	10	5	0	,,	,,
20 × 10	permanent green	11	10	0	,,	,,
18 × 10	,, ,,	9	10	0	,,	,,
16 × 8	,, ,,	6	10	0	,,	,,

TILES.

	s.	d.		
Best plain red roofing tiles	42	0	per 1000 at	rly. depôt.
Hip and Valley tiles	3	7	per doz.	,, ,,
Best Brosely tiles	50	0	per 1000	,, ,,
Do. Ornamental tiles	52	6	,,	,, ,,
Hip and Valley tiles	4	0	per doz.	,, ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000	,, ,,
Do. Ornamental do	60	0	,,	,, ,,

TILES—(*continued*).

	s.	d.			
Hip tiles	4	0	per doz.	at rly.	depôt.
Valley tiles	3	0	,,	,,	,,
Best Red or Mottled Stafford shire do. (Peakes)	51	9	per 1000	,,	,,
Do. Ornamental do	54	6	,,	,,	,,
Hip tiles	4	1	per doz.	,,	,,
Valley tiles	3	8	,,	,,	,,
Best "Rosemary" brand plain tiles	48	0	per 1000	,,	,,
Best Ornamental tiles	50	0	,,	,,	,,
Hip tiles	4	0	per doz.	,,	,,
Valley tiles	3	8	,,	,,	,,
Best "Hartshill" brand plain tiles, sand faced.	50	0	per 1000	,,	,,
Do. pressed	47	6	,,	,,	,,
Do. Ornamental do	50	0	,,	,,	,,
Hip tiles	4	0	per doz.	,,	,,
Valley tiles	3	6	,,	,,	,,

WOOD.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	15	10	0	16	10	0
Deals: best 3 by 4	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	10	0	12	10	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less thn best		
Battens: seconds	0	10	0	,,	,,	,,
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	9	10	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	9	10	0
Foreign Sawn Boards—1 in. and 1½ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	15	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0
Joiners' Wood.						
White Sea: first yellow deals, 3 in. by 11 in	At per standard. 23	0	0	24	0	0
3 in. by 9 in.	21	0	0	22	10	0
Battens, 2½ in. and 3 in. by 7 in.	17	0	0	18	10	0
Second yellow deals, 3 in. by 11 in	18	10	0	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	15	10	0	16	10	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	12	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0
Petersburg: second yellow deals, 3 in. by 11 in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	10	0	14	0	0
Do. 3 in. by 9 in.	13	0	0	14	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg:—						
First white deals, 3 in. by 11 in.	14	10	0	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	13	10	0
,, ,, battens	9	10	0	10	10	0
Pitch-pine: deals	16	10	0	20	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	35	0	0	upwards.		
Oddments	24	0	0	26	0	0
Seconds, regular sizes	26	10	0	28	10	0
Yellow Pine oddments	22	0	0	24	0	0
Kauri Pine—Planks, per ft. cube	0	3	6	0	5	0
Danzig and Stettin Oak Logs—Large, per ft. cube	0	2	6	0	3	6
Small ,, ,,	0	2	3	0	2	6
Wainscot Oak Logs, per ft. cube.	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	7	0	0	8
¾ in. do. do.	0	0	6½		—	
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	21	0	0
American Whitewood Planks—per ft. cube	0	4	0		—	
Prepared Flooring—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	0	13	6
¾ in. by 7 in. do. do. do.	0	14	0	0	18	0
1 in. by 7 in. white do. do.	0	10	0	0	11	6
1 in. by 7 in. do. do. do.	0	11	6	0	13	6

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0 ...	7	5	0
Compound Girders, ordinary sections	8	2	6 ...	9	5	0
Angles, Tees and Channels, ordinary sections	7	17	6 ...	8	17	6
Flitch Plates	8	5	0 ...	8	15	0
Cast Iron Columns and Stanchions including ordinary patterns	7	2	6 ...	8	5	6

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
Iron—						
Common Bars	7	5	0 ...	7	15	0
Staffordshire Crown Bars, good merchant quality	7	15	0 ...	8	5	0
Staffordshire "Marked Bars"	10	0	0 ...	—		
Mild Steel Bars	8	15	0 ...	9	5	0
Hoop Iron, basis price	9	5	0 ...	9	10	0
,, ,, Galvanized	17	10	0 ...	—		
('And upwards, according to size and gauge.)						
Sheet Iron (Black)—						
Ordinary sizes to 20 g.	9	15	0 ...	—		
,, ,, 24 g.	10	15	0 ...	—		
,, ,, 26 g.	12	5	0 ...	—		
Sheet Iron, Galvanised, flat, ordinary quality—						
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12	15	0 ...	—		
Ordinary sizes to 22 g. and 24 g.	13	5	0 ...	—		
,, ,, 26 g.	14	5	0 ...	—		
Sheet Iron, Galvanised, flat, best quality—						
Ordinary sizes to 20 g.	16	0	0 ...	—		
,, ,, 22 g. and 24 g.	16	10	0 ...	—		
,, ,, 26 g.	18	0	0 ...	—		
Galvanised Corrugated Sheets—						
Ordinary sizes 6 ft. to 8 ft. 20 g.	12	10	0 ...	—		
,, ,, 22 g. and 24 g.	13	0	0 ...	—		
,, ,, 26 g.	13	15	0 ...	—		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	15	0 ...	—		
Best Soft Steel Sheets, 22 g. & 24 g.	12	15	0 ...	—		
,, ,, ,, 26 g.	14	0	0 ...	—		
Cut nails 3 in. to 6 in	9	0	0 ...	9	10	0
(Under 3 in., usual trade extras.)						

LEAD, &c.

	Per ton, in London. £	s.	d.	£	s.	d.
Lead—Sheet, English, 3lb. and up	14	15	0 ...	—		
Pipe in coils	15	5	0 ...	—		
Soil pipe	17	15	0 ...	—		
Compo pipe	17	15	0 ...	—		
Zinc—Sheet—						
Vieille Montagne ton	26	5	0 ...	—		
Silesian	26	0	0 ...	—		
Copper—						
Strong Sheet per lb.	0	0	10½ ...	—		
Thin ,, ,,	0	0	11½ ...	—		
Copper nails ,,	0	0	11 ...	—		
Brass—						
Strong Sheet ,,	0	0	10 ...	—		
Thin ,, ,,	0	0	11 ...	—		
Tin—English Ingots ,,	0	1	4 ...	—		
Solder—Plumbers' ,,	0	0	6½ ...	—		
Tinmen's ,,	0	0	8 ...	—		
Blowpipe ,,	0	0	9 ...	—		

ENGLISH SHEET GLASS IN CRATES.

	2d. per ft. delivered.
15 oz. thirds	1½d. ,, ,,
,, fourths	3d. ,, ,,
21 oz. thirds	2½d. ,, ,,
,, fourths	3½d. ,, ,,
26 oz. thirds	3d. ,, ,,
,, fourths	4½d. ,, ,,
32 oz. thirds	4d. ,, ,,
,, fourths	2½d. ,, ,,
Fluted Sheet, 15 oz.	3½d. ,, ,,
,, 21 oz.	1½d. ,, ,,
⅛ Hartley's Rolled Plate	1⅝d. ,, ,,
⅜ ,, ,, ,,	2⅛d. ,, ,,
½ ,, ,, ,,	

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes or barrels	per gallon	0	1	6
,, ,, ,, in drums	,,	0	1	9
Boiled ,, ,, in pipes or barrels	,,	0	1	9
,, ,, ,, in drums	,,	0	2	0
Turpentine, in barrels	,,	0	3	7
,, in drums	,,	0	3	9
Genuine Ground English White Lead	per ton	19	0	0
Red Lead, Dry	,,	19	0	0
Best Linseed Oil Putty	per cwt.	0	7	6
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

*** Denotes *accepted.* † Denotes *provisionally accepted.***

CAPE TOWN.—For Cape Town Exhibition Stand, for Messrs. S. Chivers & Sons, Ltd. Messrs. George Baines & R. Palmer Baines, architects, 5, Clement's-inn, Strand, London, W.C.:—

Kerridge & Shaw	£297
*W. Saint, Devonshire-road, Cambridge	257

CORK.—For improvement and repair to No. 1, Patrick's-hill. Messrs. W. H. Hill & Son, architects, 28, South-mall, Cork:—

W. J. O'Mahony, 4, Ard Bara*	£400

CROWLE.—For pulling down Wesleyan Chapel and erecting new chapel, vestries, etc., at Crowle, Lincs. Mr. T. Brownlow Thompson, architect, 15, Parliament-street, Hull. Quantities by architect:—

Bourne & Wilkinson	£3,793	0	4
A. E. Pearce	2,994	19	6
W. Clarke & Son	2,784	12	0
A. J. Elmes	2,745	4	9
T. Wood	2,691	8	0
Bowman & Son	2,665	0	0
F. W. Wilson	2,547	19	6
F. M. Thompson	2,350	0	0
H. T. Arnott	2,350	0	0
H. Kaye	2,333	3	0
J. Walker	2,272	17	6
C. Sprakes & Sons	2,250	0	0
J. R. Woods	2,215	0	0
E. Good & Son	2,158	11	9
W. Barton	£2,150	0	0
B. Ashton & Son	2,149	2	10
H. Kelsey, sen.	2,120	0	0
H. Kelsey, jun.	2,106	0	0
Exors. J. E. Train	2,070	18	6
T. Cooke	2,066	7	6
R. Stewart	2,050	0	0
S. R. & T. Kelsey	2,038	0	0
Amalgamated Builders	2,019	17	10
D. Gill & Son, Doncaster*	1,977	0	0

DURHAM.—For the construction of sewage tanks and filter beds, etc., near Sherburn House Colliery, for the Rural District Council. Mr. G. Gregson, Surveyor to the Council:—

A. Errington	£269	0	0
J. G. Bradley	260	0	0
J. Carrick, Durham*	£255	5	8

DURHAM.—For the construction of 645 lineal yards of 12-in. pipe sewer and sewage tanks and filter beds, etc., near Framwellgate Moor, for the Rural District Council. Mr. G. Gregson, Surveyor to the Council:—

J. Carrick	£1,916	15	6
J. G. Bradley	1,895	0	0
A. Errington, Hetton-le-Hole*	£1,797	0	0

FOLKESTONE.—For proposed alterations, Town Hall, Folkestone. Mr. R. Pope, architect, 17, Cheriton-place, Folkestone:—

Wallis	£4,549	Hayward & Paramor	£3,789
White	4,196	Castle & Son	3,749
Fearon	4,149	Smith & Son	3,489
Tunbridge	4,076	Parsons*	3,350
Crosswell	3,850		

GRANGEMOUTH (Stirling). — Accepted for the erection of bakery, stables, byre, van shed, etc., for the Co-operative Society, Ltd. Messrs. Wilson & Tait, architects, 9, Armfield-place, Grangemouth. Quantities by architects:—

Digger, Mason, and Brick Work: J. J. & P. McLachlan, Larbert	£3,350	0	0
Carpenter and Joiner Work: A. Williamson & Son, Grangemouth	1,137	18	3
Plumber, Gasfitting, and Ventilating Work: Atken Bros., Grangemouth	726	14	9
Iron and Steel Work: P. & W. McLellan, Glasgow	696	7	2
Plaster, Cement, and Tiler Work: James Russell, Grangemouth	417	0	0
Slater Work: J. Stewart, Bainsford, Falkirk	329	4	0
Glazier Work: D. O'May, Falkirk	127	16	8

GOSPORT.—For erecting depot for Gosport and Fareham Electric Tramways at Hoeford, for the Provincial Tramways Company, Ltd. Mr. John Glenn, C.E., architect, 11, Queen Victoria-street, London, E.C., and Gosport:—

	Power Station.	Car Shed.	Workshops.	Total.
S. Salter	£6,610 ..	£3,800 ..	£1,495 ..	£11,905
M. Jones	6,530 ..	3,795 ..	1,525 ..	11,850
J. Croad	6,400 ..	3,700 ..	1,450 ..	11,550
W. Ward	6,074 ..	3,805 ..	1,346 ..	11,225
Evans & Sons	5,988 ..	3,779 ..	1,372 ..	11,139
J. Crockerell	5,270 ..	3,725 ..	1,383 ..	10,378
M. Quick	5,300 ..	3,620 ..	1,345 ..	10,265
M. Coltherup	5,365 ..	3,433 ..	1,275 ..	10,073
F. Corke	5,139 ..	3,619 ..	1,282 ..	10,040
H. C. Sweetland*	5,435 ..	3,275 ..	1,060 ..	9,770

GOSPORT.—For constructing tramways for electric traction at Gosport and Fareham, for the Provincial Tramways Company, Ltd. Mr. John Glenn, engineer, 11, Queen Victoria-street, London, E.C., and Gosport:—

—	Gosport.	Gosport to Hoeford.	Hoeford to Fareham.	Gosport to Alverstoke.	Feeder Cables.	Total.
	£	£	£	£	£	£
Pethick Bros.	26,757	11,053	18,637	9,060	9,040	74,527
C. L. Duke	26,108	10,362	17,335	8,588	9,132	71,525
J. Mowlem & Co., Ltd.	24,306	9,822	17,053	8,459	8,585	69,225
W. Griffiths, Ltd.	23,302	9,887	16,573	8,275	9,132	67,169
Blackwell & Co., Ltd.	23,528	9,391	16,771	8,119	9,133	66,942
Dick, Kerr, & Co., Ltd., London*	22,979	9,607	17,047	7,872	9,320	66,825

TENDERS—*Continued on page* 401.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITION.

Nature of Work.	By whom Required.	Premiums	Designs to be Delivered
*New Brick Church	St. Anne's Church Building Com. ..	10*l.*	May 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be Delivered
Carnegie Public Library, Atherton	.....	Bradshaw & Gass, Architects and Surveyors, Bolton	April 9
Mason's Labour, Residence at Askwith, near Otley	.....	Empsall & Clarkson, Architects, 7, Exchange, Bradford	April 10
Conv'ting No. 1, Frederick-st., Cardiff, into Two Shops	Messrs. Heitzman & Sons	Veal & Sant, Architects, Cardiff	April 11
Electric Wiring and Fittings at City Hall	Belfast Corporation	A. Brumwell Thomas, 5, Queen Anne's-gate, Westminster	do.
Main Drainage, etc., Works, Buncrana, co. Donegal	Inishowen R.D.C.	R. Moor, Clerk, Workhouse, Carndonagh, co. Donegal	do.
Foundations, Exten. of Elec. Power Sta., Chester-st.	Aston Manor Borough Council	G. H. Jack, Borough Engineer, Council House, Aston Manor	do.
170 ft. of 36-in. Riveted Steel Pipes	Manchester Corporation	Secretary, Waterworks Office, Town Hall, Manchester	do.
Drainage, Paving, etc., Flint-street, Clayton	do.	Paving, etc., Depart. (Surveyor's Office), Town Hall, Manchester	do.
Sewer Work, North-road, Newton Detached	do.	do.	do.
Sewering, etc., Bennet-street, etc., Ardwick	do.	do.	do.
Drainage, etc., Passage, Westmoreland-st., Harpurhey	do.	do.	do.
Draining Passage, Llanver-street, Harpurhey	do.	do.	do.
Addition to Stables, Levenshulme	U.D.C.	J. Jepson, Surveyor, Guardian-chambers, Tiviot Dale, Stockport	do.
Six Houses, Beachamp-street, Ashton-under-Lyne	.....	J. H. Burton & J. A. Percival, Archts., 150*A*, Stamford-st., Ashton	do.
Granite	Chelmsford Town Council	C. Brown, Borough Surveyor, 16, London-road, Chelmsford	do.
Revoe Gymnasium Apparatus	Blackpool Library Committee	J. S. Brodie, Borough Surveyor, Town Hall, Blackpool	do.
Paving and Flagging of Streets	Leeds Corporation	City Engineer's Office, Municipal-buildings, Leeds	April 12
Free Library, Church-street, Heywood	Heywood Library Committee	North & Robin, Architects, 203, Strand, London	do.
Carting 4,000 Tons of Setts	Lancashire County Council	W. H. Schofield, A.M.Inst.C.E., County Offices, Preston	do.
Heat'g & Hot-Water Apparatus, Granelly Hill W'kh'se	Aston Guardians	C. Whitwell & Son, Architects, 23, Temple-row, Birmingham	do.
Jobbing Work (Improvements Department)	Glasgow Corporation	W. C. Menzies, 22, King-street, Glasgow	do.
Smith's Sh. & Chim. St'k, Trade-st. Pub. W'ks Depot	Cardiff Corporation	W. Harpur, M.Inst.C.E., Borough Engineer, Cardiff	do.
Convent at Tubbercurry, co. Sligo	The Marist Sisters	A. Brunty, Surveyor, St. Andrew's-cham., 1, College-st., Dublin	do.
Boys' and Girls' Gymnasia, Buile Hill, Pendleton	Salford Corporation	Mr. Wilsher, Parks Superintendent, Peel Park, Salford	do.
Deck Bridges	Bombay, Baroda, Cen. India Ry. Co.	T. W. Wood, Gloucester House, Bishopsgate-st. Without, London	do.
Switches	do.	do.	do.
Forming Footpath with Tar Paving in Dock-road	Tynemouth Corporation	J. F. Smillie, Borough Surveyor, Tynemouth	do.
Dust Destructor and Electricity Supply Station	Partick Town Council	Electricity Works, Mauldslie-street, Partick	do.
Slop Vans, Water Vans, and Material Carts	Willesden D.C.	Engineer to the Council, Public Offices, Dyne-rd., Kilburn, N.W.	do.
Hardwood Paving Blocks	Rochdale Corporation	Borough Surveyor, Town Hall, Rochdale	do.
Sanitary Paving Blocks	do.	do.	do.
Two Semi-detached Villas, Tavistock-rd., Launceston	Ministers of Launceston Wes. Circuit	E. Wise, Architect, Launceston	do.
New Wing, etc., to Resid. & Stabl., The Grove, Balrath	Mr. F. D. Osborne	F. Shaw, Architect, 36, South Frederick-street, Dublin	do.
Well at Power Station	Ipswich Corporation	F. Ayton, Engineer, Constantine-road, Ipswich	April 13
Stores (Electric Supply and Tramways Departments)	do.	do.	do.
10 Houses & 2 Shops, Barras-st. & Pl., Up. Wortley	.....	J. Charles & Sons, 98, Albion-street, Leeds	do.
Sixteen Cottages at Graigberthllwyd	Building Club	W. Dowdeswell, Architect, Treharris	do.
Street Watering	Hoddesdon U.D.C.	R. Lindon, Surveyor, High-street, Hoddesdon	do.
Water Meters	do.	Secretary, Waterworks Office, Town Hall, Manchester	do.
Drainage Works, Lunatic Dept., Workho. (new bdgs.)	South Dublin Guardians	J. P. Condon, Clerk, James's-street, Dublin	do.
Two Platforms, Victoria-square	Bradford Corporation	J. H. Cox, City Surveyor, Town Hall, Bradford	do.
*Repairs at Relief Station, Stockwell-road	Lambeth Guardians	Guardians' Board Rooms & Offices, Brook-st., Kennington-rd., S.E.	do.
*Repairs at Norwood Schools	do.	do.	do.
Road Materials	Gravesend Borough Council	F. T. Grant, Borough Surveyor, Town Hall, Gravesend	April 14
Road Works and Sewer to Hospital Site	Northwich, etc., Hospital Committee	J. Cawley, Architect, Northwich	do.
Small Mortuary at Victoria Hospital, Richmond	.....	Clark & Moscrop, Architects, Darlington	do.
Materials (Sewage Department)	Glasgow Corporation	T. Melvin, Sewage Works, Swanston-street, Glasgow	do.
Second Half of Electricity Generating Station	Stepney Borough Council	M. W. Jameson, Engineer, 15, Great Alie-street, Whitechapel	do.
Eight Miles of Cast-Iron Pipes, etc.	Thurso Town Council	D. J. Reid, C.E., Inverness	do.
3,000 Tons of Guernsey Granite	Poole Borough Council	J. Elford, Borough Surveyor, Poole	do.
Stores	Epsom U.D.C.	Surveyor's Office, Bromley Hurst, Church-street, Epsom	April 15
Artisans' Dwellings at Sallynogging	Kingstown U.D.C.	Town Clerk, Town Hall, Kingstown, Ireland	do.
Artisans' Dwellings at Cross-avenue, South	do.	do.	do.
Mission Hall, Bird's Royd, Brighouse	.....	A. G. Dalzell, Architect, 15, Commercial-street, Halifax	do.
Exhaust Steam Grease Separators	Belfast Gas and Electric Committee	V. A. H. M'Cowen, City Electrical Engineer, Belfast	do.
Auxiliary Feed-water Heater	do.	do.	do.
Repairing Enbankment on South Side of Clyde	Glasgow Corporation	A. B. M'Donald, City Engineer, Glasgow	do.
South African War Monument, Earlestown	Newton-in-Makerfield W.F. Com'tee.	C. Cole, Honorary Secretary, Town Hall, Earlestown	April 16
Taking Down, Rebuilding part Ousebridge Inn, York	S. Smith	T. Winn & Sons, Architects, 92, Albion-street, Leeds	do.
Road Material	Hunslet R.D.C.	W. B. Pindar, Clerk, Glasshouse-street, Hunslet	do.
Team Labour for Year	Neston and Parkgate U.D.C.	Surveyor, Town Hall, Neston	do.
Broken Stone and Chippings	do.	do.	do.
Laying Fireclay Pipes from Raith Gate	R. C. Munro-Ferguson	W. D. Sang & Lockhart, C.E., Kirkcaldy	do.
Materials	Wing R.D.C.	M. G. Gurney, Surveyor, Leighton Buzzard	do.
Granite	Reigate Borough Council	Borough Surveyor, Municipal-buildings, Reigate	do.
Alterations and Additions to Schools at Glentham	Lindsey County Council Educa. Com.	Scorer & Gamble, Architects, Bank-street-chambers, Lincoln	do.
Shed (336 ft. by 120 ft.) at Cattle Depot	Dundee Harbour Trustees	J. Thompson, Harbour Engineer, Dundee	April 18
*Swedish Yellow Deal Creosoted Paving Blocks	St. Marylebone Borough Council	Borough Surveyor, Town Hall, Marylebone-lane, W.	do.
Road and Footpath Materials	Hoyland Nether U.D.C.	W. P. Young, Surveyor, Town Hall, Hoyland, near Barnsley	do.
Buildings for Electricity Supply & Refuse Destructor	Todmorden Corporation	Electrical Engineer's Office, Todmorden	do.
Chimney	do.	do.	do.
Steel Roof Trusses	do.	do.	do.
Special (Permanent Way) Track Work	Manchester Corporation	J. M. M'Elroy, Tramways Department, 55, Piccadilly, Manchester	do.
Permanent Way Points, Tongues, etc.	do.	do.	do.
Sewage Pumping Machinery	Waltham Holy Cross U.D.C.	W. T. Streather, Eng. to Council, High Bridge-st., Waltham Abbey	do.
Barn, Nevie, Glenlivet	.....	Gordon-Richmond Estate Offices, Drumin, Glenlivet	do.
Additions, etc., to Steading, at Ballenleish, Strathaven	.....	do.	do.
Repairs to Barn and Stable, Croughly, Strathaven	.....	do.	do.
Repairs to Stable, etc., at Campdalemore, Strathaven	.....	do.	do.
Repairs to Dwelling House at Milton, Cabrach	.....	do.	do.
Repairs to Byre and Cattle Sheds at Achgourish	.....	do.	do.
Excavation and Pipe Laying	Hipperholme U.D.C.	G. W. Thompson, Surveyor, Council Offices, Hipperholme	do.
*Timber, etc., at Foleshill Works, for Two Acid Chrs.	Coventry Corporation	Engineer and General Manager, Gas Works, Coventry	do.
Gasholder, etc.	East Dereham U.D.C.	H. Kitson, Gas Manager, East Dereham	do.
Engine-house and Boiler-house at Burdon Pump. Stn.	Sunderland, &c., Water Company	T. & C. Hawksley, Engineers, 30, Gt. George-st., Westminster, S.W.	April 19
Alterations to Water Supply at Workhouse	Cannock Guardians	Willcox & Raikes, Eng., Union-chambers, 63, Temple-row, Bir'ham	do.
Making-up Stanley-road	Carshalton U.D.C.	W. W. Gale, Surveyor to Council, Carshalton	do.
Rest'n. Nave & Aisle, Northorpe Ch., nr Kirt'n Lindsey	.....	C. Hodgson Fowler, F.S.A., The College, Durham	do.
Bandstand, Downhills Park, Tottenham	U.D.C.	E. Crowne, Clerk, Tottenham	do.
Materials	Chadderton U.D.C.	Surveyor, Town Hall, Chadderton	do.
Team Labour	do.	do.	do.
*Making-up Hendrick's-terrace	Tottenham U.D.C.	Engineer to the Council, 712, High-road, Tottenham, N.	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be Delivered
Painting, etc., of Workhouse Hospital, Arclid	Congleton Guardians	The Master at the Workhouse	April 20
Cottage at Dalvey Offices		P. Fulton, Architect, Forres	do.
Flints	Tendring R.D.C.	J. Bell, Highway Surveyor, Weeley, Colchester	do.
Stables, Fire Brigade Station, etc., New Tredegar	Bedwellty U.D.C.	M. J. H. Lewis, Surveyor, Blackwood, Mon.	do.
Alterations on Dennistown Depot	Glasgow Corporation	J. Young, 102, Renfield-street, Glasgow	do.
*Paving Works	Hammersmith Borough Council	Borough Surveyor, Town Hall, Hammersmith	do.
Iron Timber-framed Hospital for Twenty-four Beds	Bilston U.D.C.	J. P. Wakeford, Engineer and Surveyor, Town Hall, Bilston	April 21
Thirty Cottages, St. George's-road, Gillingham		E. J. Hammond, Architect & Surveyor, 21, Balmoral-rd., Gillingham	do.
*Coastguard Signal Sta., etc., Seaham Harb., Durham	Admiralty	Works Dept., Admiralty Office, 21, Northumberland-avenue, W.C.	April 22
20,000 Tons of Road Metal	Bradford Corporation	J. H. Cox, City Surveyor, Town Hall, Bradford	April 23
*Additions to Union Workhouse	Ludlow Union	W. W. Robinson, Architect, 10, King-street, Hereford	do.
Road Materials	Tenterden Town Council	W. L. C. Turner, Borough Surveyor, Town Hall, Tenterden	do.
Railway Sleeper Blocks	N. E. Railway Co.	E. H. Clark, Stores Superintendent, Gateshead	do.
Fence Posts and Rails	do.	do.	do.
Additions to School Buildings, Llandaff	Governors, Howell's Glam. Co. Sch.	J. E. Halliday, F.R.I.B.A., 14, High-street, Cardiff	do.
Lowering rd. nr. Old Whiterose Stables, New Tredegar	Bedwellty U.D.C.	M. J. H. Lewis, Surveyor, Blackwood, Mon.	do.
Painting and Renovating Chapel and Schoolroom	Faldingworth Wes. Chapel Trustees	G. Stamp, Faldingworth	April 25
Stores	Madras Railway Company	W. H. Cole, 61, New Broad-street, London, E.C.	do.
*Additions and Alterations to Workhouse, Ottershaw	Chertsey Union	Clerk to the Guardians, 80, Guildford-street, Chertsey	do.
*New Bridge at Stanwell-hill	County Council of Middlesex	County Engineer, Middlesex, Guildhall, Westminster, S.W.	do.
Branch Store & Dwelling Hse, etc., Thornton, Bradf'd	Queensbury Industrial Society	M. Hall, Architect, 1, Harrison-road, Halifax	April 26
Arched Bridge over the River Wharfe at Ilkley	Wharfedale (Ilkley) Estate Co., Ltd.	J. B. Fraser, 8, Park-square, Leeds	do.
Additions and Alterations to Herefordshire Gen. Hos.	Board of Management	Nicholson & Hartree, Architects, Hereford	April 27
Widening part of Railway, Gateshead	N.E. Railway Company	C. A. Harrison, Central Station, Newcastle-on-Tyne	do.
Storage Reservoir, near Canal-road	Bradford Corporation	J. Watson, M.Inst.C.E., Waterworks Engineer, Town Hall, Bradford	April 28
Retaining Wall to Divert Bradford Beck	do.	do.	do.
Intercepting Sewer, Dorset-road	Bexhill Corporation	G. Ball, Borough Surveyor, Town Hall, Bexhill	do.
Road Improvement Works	Luton Town Council	Borough Surveyor, Town Hall, Luton	do.
School, Blaenclydach	Rhondda U.D.C.	J. Rees, Architect, Hillside Cottage, Pentre	April 29
Well at Flamborough, Yorks.	Bridlington R.D.C.	Elliott & Brown, Engrs., Burton-bldgs., Parliament-st., Nott'ham	do.
*Coastguard Station at Robin Hood's Bay, Yorkshire	Admiralty	Works Department, Admiralty, 21, Northumberland-avenue, W.C.	do.
*Coastguard Station at Whitby, Yorkshire	do.	do.	do.
*Painting, Glass Roof Shelter, Granite Paving, etc.	Kingston Union	W. H. Hope, C.E., Seymour-road, Hampton Wick	May 2
*Alterations at Langley House, East India Dock-road	Poplar Union	J. & W. Clarkson, 136, High-street, Poplar, E.	May 6
Warming & Hot-water Sup. of New Workhse, Wesham	Fylde Guardians	Haywood & Harrison, Architects, Accrington	May 9
*New Town Hall and Fire Brigade Station	Sutton Coldfield Corporation	Borough Surveyor, Council House, Sutton Coldfield	May 16
*Heating Town Hall, Police Court, etc.	Folkestone Corporation	Reginald Pope, Architect, Folkestone	No date.
Two Shops in Carmel-street, Abertillery	Dr. Clifford Price	E. Price, Chemist, Abertillery	do.
Nine Houses, Bowling Hall-road, Bradford		A. Collinson, Builder on the Works	do.
Residence at The Barton, Hereford	H. Evans	Grooms & Bettington, Architects, Palace-chambers, Hereford	do.
Prim. Methodist Sunday Sch's & Institute, Walkley		W. J. Taylor, Architect, 39, Bank-street, Sheffield	do.
Furniture to Hospital	Glasgow Parish Council	J. R. Motion, 266, George-street, Glasgow	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Architectural Assistant	City of Birmingham	3*l.* per week	April 12
*Building Inspector	City of Sheffield	120*l.*	April 15
*Architectural Assistant and County Surveyor	County of Southampton	250*l.*	April 16
*Foreman of Works	Gold Coast Government	300*l.* per annum	April 19

Those marked with an asterisk (*) are advertised in this Number. *Competitions,* *Contracts,* iv. vi. viii. x. xii. *Public Appointments,* xvi

TENDERS—*Continued from page 339.*

GOSPORT. — For extensions to mineral water factory, for Messrs. Mumby & Co. Mr. W. H. Fry, A.M.I.C.E., architect, Gosport. Quantities by the architect :—

R. W. Lowe	£2,188	C. M. Dash	£1,889
F. Corke	2,093	H. Jones, Portsmouth*	1,883
J. Croad	1,990		
J. Crockerill	1,931		

HALE (Cheshire).—For new drainage works, for the Urban District Council. Mr. F. J. Lobley, Engineer, Hale :—

G. Bosson	£707 10 0	W. Watson	£648 12 0
F. Hamilton & Son	688 0 0	Wellerman Bros.	618 1 6
Naylor & Sons	678 11 9	S. Hutton, Bowdon*	569 0 4

HELENSBURGH.—For formation and repair of footpaths, for the Town Council. Mr. J. R. Wilson, C.E., Burgh Surveyor, Helensburgh :—

A. Lindsay, East King-street, Helensburgh*.
[Amount of contract about £2,000.]

IVYBRIDGE.—For 650 tons of broken stone, for the Urban District Council. Mr. W. R. Parker, Surveyor, Ivybridge :—

	s.	d.		
J. Harvey Dickson	6	1	per ton	Delivered
Coker	5	6	,, ,,	
Lapthorn	5	3	,, ,,	
Kent	5	6	,, ,,	
Phillips, Ivybridge*	4	8	per yd. cubic (at quarries).	

LEICESTER. — For extension of machine shop (builder's work only), for Messrs. Taylor & Hubbard, crane makers. Messrs. Tait & Herbert, architects, Leicester and Coventry :—

Hardington & Elliot	£1,239	Dyers & Yates	£1,150
J. E. Johnson & Son	1,236	J. O. Tewsbury	1,085
Freer	1,190	Bowles & Son	1,065
		F. Elliot*	1,050

[All of Leicester.]

LICHFIELD.—For erecting fourteen workmen's dwellings in Upper-street, John-street, for the Sanitary Committee of the City Council. Mr. Emerson Brooke, City Surveyor, Lichfield :—

J. R. Deacon, Lichfield £3,258 9
[Ten tenders received.]

LONDON.—For the erection of a wall at Prince's-road Workhouse, for the Lambeth Guardians :—

		Time of Completion. Months.
Good & Sons	£385 0 0	2
T. Simmonds	373 0 0	2
A. Aldridge	366 4 8	3
C. Blyton & Sons	360 0 0	2
H. Kent	349 0 0	2
H. Bragg & Sons	347 0 0	2
G. Newton	337 0 0	2
London & County Builders, 29, Alma-road, Wandsworth, S.W.*	336 8 0	2

LONDON. — For addition and alterations to business premises, Nos. 26 and 28, Kirkdale, Sydenham, for Messrs. Sydney Smith & Sons, Ltd. Mr. George Pratt, architect and surveyor, Railway-approach, Sydenham :—

J. Pratt	£1,025 0 0	H. Covey & Co.	£879 15 0
S. R. Best	899 5 0	J. M. Stewart*	799 0 0

LONDON.—For the erection of detached residence in Dollis-avenue, Church End, Finchley, N., for Mr. G. H. Ohlson. Messrs. Bennett & Richardson, architects, The Broadway, Church End, Finchley, N. :—

C. F. Day	£1,100	C. W. Scott	£1,010
Shewry & Sons	1,025	J. Phœnix*	990

LONDON.—For electric wiring of buildings, etc., at the generating station, Bermondsey, for the Borough Council. Messrs. Kincaid, Waller, Manville, & Dawson, engineers, Westminster :—

Sunderland & Co.* £430

LONDON.—For erecting two houses, Well-street, Hackney, for Mr. John Robbins. Mr. A. S. Caughey, architect, 19, Avenue-road, Leytonstone, E. Quantities by architect :—

W. E. Westgate	£717 10	F. Gowen	£549 10
H. Wood	615 0	E. Saunders	546 10
T. B. Campion	596 0	Welbking & Co.	540 0
R. Woollston & Co.	580 0	James Abbott, Walthamstow	490 0
S. Kirch	550 0		

MARKET HARBOROUGH.—For an iron and wood hospital, in two wards of two beds each, with central duty room and lobby, for the Urban District Council :—

G. Jarman & Sons, Little Bowden* £115

NECHELLS (Birmingham).—For the construction of electric power transmission scheme buildings, for the Birmingham Tame and Rea District Drainage Board and the Corporation for the City of Birmingham. Mr. J. D. Watson, Engineer to the Board :—

	Buildings.			Furnace Chimney.					
	£	s.	d.	£	s.	d.	£	s.	d.
J. A. Meredith	19,819	5	8	1,471	11	5	21,290	17	1
Wilkins & Sons	18,746	0	0	1,747	0	0	20,493	0	0
E. Garfield	18,210	0	0	1,630	0	0	19,840	0	0
G. Jackson	17,635	10	3	1,478	17	4	19,154	7	7
W. Wistance	17,433	0	0	1,516	0	0	18,949	0	0
C. Bryant	17,093	0	0	1,404	0	0	18,497	0	0
Costain & Sons	17,122	0	0	1,252	0	0	18,374	0	0
Whitehouse & Sons	16,595	0	0	1,362	0	0	17,957	0	0
G. Webb	16,630	0	0	1,239	0	0	17,869	0	0
I. Langley	16,195	3	8	1,486	19	1	17,682	1	9
W. H. James	15,839	0	0	1,435	0	0	17,274	0	0
W. & J. Webb	15,733	0	0	1,425	0	0	17,158	0	0
W. Hopkins	15,400	0	0	1,494	0	0	16,894	0	0
Haycock & Sons	15,361	0	0	1,490	0	0	16,851	0	0
H. Dorse	15,103	19	9	1,250	0	0	16,353	19	9
Lowe & Sons	14,887	0	0	1,223	0	0	16,110	0	0
Barnsley & Sons	14,886	0	0	1,196	0	0	16,084	0	0
Hodson & Sons	14,906	19	9	1,136	19	5	16,043	19	2
Dallow & Sons	14,850	0	0	1,025	0	0	15,875	0	0
T. Johnson	14,409	0	0	1,247	0	0	15,656	0	0
Lee & Sons, Birm'gham*	14,466	0	0	1,149	0	0	15,615	0	0
Alphons Custodis Co.	—			1,297	0	0	—		
Universal Engineering Co.	—			1,057	0	0	—		

PAISLEY.—For street works (Camphill, Lacy, New Stock, and Walker streets), for the Town Council. Mr. James Lee, C.E., Borough Surveyor, Paisley. Quantities by Engineer :—

Camphill-street.			
A. A. R. Lang, Contractor, Gourock, N.B.*	£533	15	10
Lacy-street.			
A. A. R. Lang, Contractor, Gourock, N.B.*	981	9	6
Walker-street.			
A. A. R. Lang, Contractor, Gourock, N.B.*	790	19	6
New Stock-street.			
Greig Bros. & Co., 163, Hope-street, Glasgow*	471	0	6

PAISLEY.—For brick culvert, etc., covering of Ladyburn, for the Town Council. Mr. James Lee, C.E., 13, Gilmour-street, Paisley. Quantities by Engineer :—
A. Stark & Sons, 142, West Nile-st., Glasgow* £503 6 3

PORTSMOUTH.—For alterations and additions to the Empire Palace of Varieties (first section). Mr. W. H. Fry, A.M.I.C.E., Gosport, architect. Quantities by the architect :—

W. Ward ..	£1,290	0	0	S. Salter	£1,149 0 0
Light & Son.	1,233	0	0	J. Crockerill ..	1,145 0 0
Croad & Son .	1,210	0	10	H. Jones	1,097 0 0
Clark & Son .	1,195	0	0	M. Coltherup .	1,075 0 0
Tubb & Son .	1,150	0	0	F. Corke*	1,048 0 0

[All of Portsmouth.]

PORTADOWN (Ireland).—For the first section of waterworks (twenty-four miles of pipes and two service reservoirs), for the Portadown and Banbridge Joint Board. Messrs. R. H. Dorman & J. H. H. Swiney, engineers, Armagh and Belfast. Quantities by engineers :—

J. Moran & Son	£64,881	11	8	M. Green ..	£42,467 0 11
R. Calhoun ..	49,068	0	0	J. Ross & Son	42,218 1 6
Courtney & Co.	46,970	0	0	Whyte & Co.	42,154 1 7
J. Kelly	46,305	1	4	J. Graham ..	39,782 3 2
H. & J. Martin, Ltd...	45,197	0	0	McKee & McNally..	38,021 7 2
Wright & Son	45,172	5	3	R. C. Brebner	37,344 10 6
J. G. White & Co.	44,302	13	10	Collen Bros., Ltd., Portadown* ..	36,000 0 0
Heggarty & Gault	43,849	0	0		

REIGATE.—For alterations and decorations to Sandfels, South Park, Reigate, for Mr. P. C. Mordan. Mr. C. E. Salmon, architect, Bell-street, Reigate :—

H. Guy	£164 11	T. Nightingale*	£156

SANDAL.—For drainage works in streets off Agbrigg-road, Sandal, near Wakefield, for the Urban District Council. Mr. F. Massie, Tetley House, Wakefield. Quantities by Mr. F. Massie, Tetley House, Wakefield :—

A. Pawson	£249 7 2	Higgins & Pashley, Brook-st., Wakefield* ..	£183 17 3
E. Bell & Son..	243 3 0		
H. G. Wilson ..	185 11 0	Wright & Walling	171 19 6

SEATON DELAVAL.—For the erection of a miners' hall to seat about 500. Mr. J. Dobbinson, architect, Colliery-yard, Seaton Delaval, Northumberland :—

Robinson & Edwards, Seaton Sluice, Northumberland* £714 15 1

[Bricks and furnishing not included in this tender.]

ST. ANDREW'S (Scotland).—For the construction of a low-water swimming pond at the Castle Bathing Station, for the Town Council. Mr. W. Watson, Burgh Surveyor. Quantities by Burgh Surveyor :—

Darrie Bros...	£509 12 0	H. Ritchie & Son	£321 17 1
W. Braud & Son	508 19 1	T. S. Dicks, Broty Ferry*	293 7 1

STANLEY.—For street works, for the Urban District Council. Mr. J. Routledge, Surveyor, Council Offices, Stanley. Quantities by Surveyor :—

R. Gardner....£491	15 10	G. E. Simpson, Newcastle*..£365	14 10
A. Routledge .. 383	11 10		
T. Johnson.... 381	13 0		

SOUTHAMPTON.—For additional pavilion at Isolation Hospital, Mousehole, for the Corporation. Mr. J. A. Crowther, Borough Engineer, Southampton. Quantities by Engineer :—

H. Stevens & Co. ..£5,753		Jenkins & Sons, Ltd.£5,375	
Golding & Ansell .. 5,470		H. Lawrence*..... 4,779	

[All of Southampton.]

TAMWORTH.—For the erection of a new laboratory, etc., at the Grammar School, Tamworth, for the Governors. Mr. J. W. Godderidge, architect, 4, Bolebridge-street, Tamworth :—

J. Watton & Sons	£987 15
B. Musson, Glascote	895 0
A. Clarson & Sons*	893 10

TARVES (Scotland).—For new vestry, etc., at the Parish Church, for the Kirk Session. Mr. J. Cobban, architect, Haddo House, Tarves :—

Buchan, Thom, & Smith, Tarves* £160

TERRINGTON ST. CLEMENT.—For erecting a butcher's shop, offices, etc., for the Archangel Lodge of Oddfellows. Mr. R. W. Bryant, architect, Terrington St. Clement, Lynn :—

W. Bardell	£179 0 0
H. W. Reader	172 15 0
Sleight & Morton, Terrington St. Clement*	143 2 3

TODDINGTON (Beds.).—For new steel and iron bell framing and girders, re-casting four bells, and re-hanging the peal of eight bells, with new fittings, to the parish church. Mr. W. B. Stonebridge, architect, Woburn, R.S.O., Beds. :—

J. Warner & Sons, London* £301

TURRIFF (Scotland).—For dwelling-house and farm-steading, Hill of Barnyards, for the Town Council. Messrs. James Duncan & Son, architects, Turriff :—

Mason : J. Robb*	£176 17 0
Carpenter : J. Rae & Son*	145 0 0
Slater : J. Gammack & Co.*	78 10 0
Plasterer : J. B. Dallas*	13 5 0
	£413 12 0

[All of Turriff.]

WELLINGBOROUGH.—For the erection of new cemetery chapel, porter's lodge, entrance gates, piers, and wall, for the Urban District Council. Messrs. Talbot Brown & Fisher, architects, Burystead-place, Wellingborough :—

Berrill & Green, Wellingborough £2,360

WOBURN SANDS (Beds.).—For a cottage residence, Theydon-avenue, for Mr. F. P. Chapman, Savoy Chapel, W.C. Mr. W. B. Stonebridge, architect, Woburn, R.S.O., Beds. :—

H. Gregory	£280	C. Sinfield, Aspley* ..	£255

WOBURN SANDS.—For two pairs of villas, Weathercock-lane, for Messrs. H. G. Fisher & Son. Mr. W. B. Stonebridge, architect, Woburn, R.S.O. :—

W. T. Sharpe	£1,615 15 0	M. Fleet	£1,402 10 0
G. Botsford..	1,460 0 0	H. Gregory, Woburn* ..	1,184 0 0
C. Sinfield ..	1,431 5 9		

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